

ESSENTIAL



Career Technology

Basic 8

Facilitator's Guide



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Facilitator's Guide

Frank Fabian Aidoo • Michael N.K. Fiemawhle • Leoni Hofmeyr •
Genevieve Nketsiah
Pamela Alikem Afua Nyadroh • Peter Narh Sappor



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Introduction

The Career Technology Curriculum Common Core Programme (CCP) follows the Kindergarten-Primary standards-based school curriculum that was implemented during the 2019/2020 academic year. The CCP is designed for learners in JHS 1 to JHS 3 (Basic 7 to Basic 9) as part of a holistic learning experience that prepares learners for post-secondary education or the world of work, or for both.

The CCP focuses on the core competencies that will give learners the ability to apply knowledge innovatively to solve everyday problems. Personal projects, community projects and community service have been integrated into the CCP as part of a comprehensive assessment programme. The aim of the curriculum is to promote better high school education that meets the different learning needs of the young people in the country.

For more information, teachers should consult the Career Technology CCP Curriculum.

Learning with the CCP

The CCP for learners in junior high school emphasises a set of high, internationally-benchmarked career and tertiary education-readiness standards. Learners need to acquire these standards for post-secondary education or the workplace, or both. The standards articulate what learners are expected to know, understand and be able to do by focusing on their social, emotional, cognitive and physical development.

The three domains of learning – cognitive, psychomotor and affective – are at the centre of the CCP. The aim of these learning domains is to help produce character-minded learners who can play active roles in dealing with the increasing challenges that face Ghana and the global society.

The most important features of the CCP are:

- learning and teaching approaches: the core competencies (reading, writing, arithmetic and creativity) and pedagogical approaches
- learning context: engagement service and project
- learning areas: mathematics, science, computing, languages (English, Ghanaian Language, French and Arabic), career technology, social studies, physical and health education, creative arts and design and religious and moral education.

Learning and teaching approaches

In this section, the focus is on core competencies, pedagogical approaches, large class teaching, support for learners with special needs, learning context and learning areas and Career Technology.

Core competencies

The core competencies describe the relevant global skills for learning that the CCP will help learners develop in addition to the core competencies, reading, writing, arithmetic and creativity. The global skills for learning will help learners become critical thinkers, problem-solvers, creators, innovators, good communicators and collaborators who will be digitally literate. They will become culturally and globally sensitive citizens who will be life-long learners who have a keen interest in their personal development.

Pedagogical approaches

The CCP emphasises creative and inclusive pedagogies that are anchored in authentic and enquiry-based learning, collaborative and cooperative learning, differentiated learning, and holistic learning as well as cross-disciplinary learning.

Large class teaching

Teachers who teach large classes can use peer work to engage learners. Working in pairs or in groups, will encourage learners to take greater responsibility for their own learning. Teachers will need to be available when learners are working in groups so that they can help and guide learners and groups.

Pair and group work might reduce anxiety for some learners and make it easier for them to speak to their peers and ask questions without feeling intimidated.

Support for learners with special needs

It is important to understand how best to teach learners who have special needs. Sometimes splitting a class between teachers who are teaching the same grade can help as teachers can focus on certain groups. Co-teaching is one of the best ways to support learners who have disabilities and it encourages teachers to collaborate, plan and learn together. Teachers can work together to plan their lessons. They can use the resources in their classrooms to support learners with special needs. For example, one teacher can work with learners who have hearing disabilities in a small group, while another teacher teaches the rest of the group.

Learning context

This Facilitator's Guide supports the CCP by emphasising the engagement of learners in classroom activities and projects (both inside and outside the classroom). These projects can involve individual or group tasks that all learners are required to complete by the end of JHS 2 (Basic 8). The CCP project provides learners with contexts in which they can demonstrate creativity and inventiveness in different areas of human endeavour. Community service offers opportunities for learners to nurture, love and care for, and solve problems in their community.

Learning areas and Career Technology

The CCP comprises the following learning areas:

1. Languages (English Language, Ghanaian Languages, French, Arabic)
2. Mathematics
3. Science
4. Creative Arts and Design (CAD)
5. Career Technology (CT)
6. Social Studies
7. Computing
8. Religious and Moral Education (RME)
9. Physical and Health Education (PHE)

Rationale

Career Technology offers training for job opportunities as an integral part of everyday life since industrial technology is the backbone of most national economies. With the introduction of Career Technology, Ghana can use its many professions to create the jobs it needs to boost the development of the country.

The Career Technology course is expected to:

- Improve the nation's economy by bridging the connection between schooling, employment, productivity and trade.
- Enhance learners' outcomes in employment-related skills and competencies.

The main strengths of Career Technology as a CCP include:

- It provides learners with basic knowledge, skills and values to enable them to function in society.
- It creates the opportunity for learners to develop special aptitudes and talents through elective courses.
- Learners are able to solve real-life problems as content is built around problems in the society.
- The integration of subjects reinforces learners' understanding of concepts.

Philosophy

The Ministry of Education promotes two basic philosophies – teaching and learning.

The focus of the teaching philosophy:

- Effective Career Technology education should be inquiry-based so that it will ensure sustainable development.
- It must provide learners with opportunities to expand, change, enhance and modify the ways in which they view the scientific, technological, industrial, and economic world.
- Teaching CT is based on learner-centred technology. Teaching and learning approaches engage learners physically and cognitively so that they can develop knowledge, skills and attitudes.
- Learners should develop the ability to think critically, and collaborate and communicate with others. They should learn to be creative and develop new ideas, and learn to solve problems in an activity-driven environment.

The focus of the learning philosophy:

- Career Technology recognises the unique endowment of every learner.
- Learning CT promotes the development of learners' individual talents that are based on creativity, innovation, critical thinking, and their ability to express their ideas graphically.
- Learners work at their own pace without discrimination or comparison.
- Activities provide learners with opportunities to brainstorm, make decisions, express their ideas, and assess and evaluate their own ideas.
- Learners are able to discover their talents and develop their core competencies, and their functional and foundational skills.
- The classroom, workshops and laboratories encourage learners to participate and collaborate inclusively. They will learn to understand and respect their skills, abilities and experiences as well as those of others.

Aims

Teaching Career Technology involves both general and subject objectives.

General aims

This Facilitator's Guide works in conjunction with the new curriculum to help individuals develop so that they will become creative, innovative, technologically minded, digital literates and problem-solvers who will develop the ability to think critically.

Subject aims

Career Technology aims to:

- educate the learner using the head, heart and hands (3-H) therapy
- develop the learner's thinking capacity, reasoning power and understanding of the environment
- provide learners with the opportunity to respond and act creatively according to intuition
- instill in learners a lifelong independent and critical mind for analytical and problem-solving skills such as critical analysis, creativity and innovation
- instill in learners the ability to challenge stereotypes about gender, disability, religion, ethnicity, economic status and so on that would limit them in certain careers
- help learners develop their emotional balance, and develop balance in material, spiritual, cultural and intellectual spheres
- strengthen each learner's power of imagination, creative thinking, self-expression, critical analysis, synthesis and evaluation
- predispose learners to the technical and vocational identities of Career Technology and entrepreneurial skills needed in different industries
- develop in the learner the sense of appreciation and appraisal of Career Technology skills of the specific areas for future development.

Learning domains

This Facilitator's Guide works with the curriculum's concept of three integral learning domains that should be the basis for instruction and assessment:

- cognitive (knowledge, understanding and application)
- psychomotor (practical skills)
- affective (attitudes and values).

Knowledge, understanding and application

Learners acquire knowledge through learning experiences. They may also show understanding of concepts by comparing, summarising, re-writing, and explaining in their own words and constructing meaning from instruction. Learners may also apply knowledge they acquire in new contexts.

At a higher level, learners may be required to analyse an issue or a problem and at a much higher level, they may be required to synthesise knowledge by integrating a number of ideas to formulate a plan, solve a problem and compose a story. Furthermore, learners may be required to evaluate, estimate and interpret a concept. At the highest level, learners may be required to create, invent, compose, design and construct. These learning behaviours: knowing, understanding, applying, analysing, synthesising, evaluating and creating, fall under the domain of knowledge, understanding and application, which are described more fully in the curriculum.

Suggested teaching activities:

- Teachers select teaching and learning activities that will ensure maximum learner participation.
- Teachers avoid rote learning and drill-oriented approaches and emphasise participatory teaching and learning.
- Teachers re-order the suggested teaching and learning activities and add to them where necessary.
- Teachers help learners apply their knowledge in dealing with issues both in and out of school and help learners become problem-solvers.

Suggested evaluation activities include:

- Teachers design sets of tasks and assignments that will challenge learners to apply their knowledge to issues and problems.
- Teachers engage learners in creating new and original items or compositions.
- Teachers assist learners in developing positive attitudes for activities.
- Teachers emphasise the issues of conceptualisation, planning and making.
- Teachers guide learners to transform what they know, understand and can do into creating products.
- They observe and guide learners as they work independently or in groups.
- Teachers select and plan other learning activities to assist learners in acquiring, developing and demonstrating the subject specific practices and core competencies required.

Career Technology should be taught as a practical subject. Learners are to be taught and evaluated practically.

There will be a few theoretical lessons, but the theory must be reinforced by practical skills.

Practical skills

Practical skills involve using tools and equipment to demonstrate manipulative skills and carry out practical operations, plan to solve practical problems and produce items. The teaching and assessment of practical skills should involve projects, case studies and creative practical tasks.

The basic skills required for effective practical work include handling tools, equipment and materials (manipulative skills), observation, craftsmanship, perception, creativity and communication.

Handling tools, equipment and materials	Learners should be able to handle and use tools, equipment and materials properly when working on creative activities.
Observation	Learners should be able to use their senses to make accurate observation of skills and techniques they see during demonstrations.
Craftsmanship	Craftsmanship involves the skilful and efficient handling of materials and tools to accomplish specific tasks according to the level of the learners.
Perception	Learners should be able to respond to their environment using all their senses (sight, hearing, smell, touch, taste and movement).
Creativity	Learners should be encouraged to be creative or original and use new methods when working on projects and creating artefacts and products. They should not copy existing work.
Communication	Learners should be guided to develop the oral and written communication skills they will need for group work, reporting and appreciation.

Instructional expectations

Teachers can use discussions in the classroom, workshops, building sites and laboratories to help learners achieve the expectations of Career Technology. These discussions can guide learners to realise that people use their creativity to solve problems.

Examples:

1. People use the products of Career Technology to provide food, clothing, shelter and furniture for their homes, schools, churches, mosques, palaces and workplaces. Creating these products provides job opportunities for many people.
2. Teachers can guide learners to identify problems that affect the individual, family, community and the country including at home, at school and in the community.
3. Teachers can guide learners to discuss the effects of these problems on their education, health and sanitation, cultural beliefs and practices, job creation and employment and so on.
4. Learners can use interviews, visits, observations, reading and group or class discussions to investigate the causes of different problems.
5. Teachers can guide learners (working on their own or in groups) using brainstorming, discussions, exploration with available tools, materials, instruments and techniques to design and create projects that will help solve identified problems.
6. Teachers can ask learners to plan, display and share their artefacts in exhibitions and performances with peers and other members of the community.
7. Teachers can guide learners to appreciate, appraise and critique their work, document outcomes, reflect creatively on their findings and use the feedback to modify products or create new projects.

Core competencies

The core competencies are a set of skills that teachers need to help learners develop. These skills will help learners engage with the subject matter as they learn the subject.

The core competencies listed are included in each section of this Facilitator's Guide:

- Critical thinking and problem solving (CP)
- Creativity and innovation (CI)
- Communication and collaboration (CC)
- Cultural identity and global citizenship (CG)
- Personal development and leadership (PL)
- Digital literacy (DL).

Assessment

In the CCP, the ideal is that assessment involves assessment for learning, assessment of learning and assessment as learning, which are described in the text that follows.

In Career Technology, assessment is based on the three domains of learning. When developing assessment procedures, teachers should select indicators in a way that makes it possible for them to assess a representative sample from a given module. Each indicator in the curriculum is seen as a criterion to be achieved by the learners. When teachers develop assessment items or questions that are based on a representative sample of the indicators taught, the assessment is called criterion-referenced assessment. In many cases, a teacher cannot assess all the indicators that are taught in a term or in a year. The assessment procedure they use (class assessments, homework, projects and group work presentations) must be developed in such a way that the different procedures complement each other to provide a representative sample of indicators that are taught over a period of time.

The following three domains are outlined in more detail in the Career Technology CCP Curriculum:

- Assessment for learning (AfL)
- Assessment of learning (AoL)
- Assessment as learning (AaL).

School-based assessment (SBA) covers all forms or modes of assessment that can be undertaken by learners, teachers and head teachers to monitor a learner's achievement over a period of time. Data collection and keeping records of the data are central to the conduct of SBA.

Assessment for learning	Assessment of learning	Assessment as learning
Class exercises	Class assessment task (CAT)	Portfolio
Quizzes	End-of-term assessment	Journal entries
Class tests (written, oral, aural and/ or practical)	End-of-year assessment	Project work
Class assessment task (CAT)	Checklist	Questionnaire

Samples of relevant records that can be kept about a learner's learning:

- learner's progress record (cumulative record)
- learner's report card
- school-based assessment per term.

Reporting school-based assessment (SBA) in the CCP

The CCP provides levels of proficiency for learners to attain and descriptors for all grade levels of the programme.

Level of proficiency	Benchmark	Grade level descriptor
1. Highly proficient (HP)	80% +	Learner shows high level of proficiency in knowledge, skills and values and can transfer understanding automatically and flexibly through authentic performance tasks.
2. Proficient (P)	68%–79%	Learner demonstrates sufficient level of proficient knowledge, skills and core understanding; can transfer understanding independently through authentic performance tasks.
3. Approaching proficiency (AP)	54%–67%	Learner is approaching proficiency in terms of knowledge, skills and values with little guidance and can transfer understanding through authentic performance tasks.
4. Developing (D)	40%–53%	Learner demonstrates developing level of knowledge, skills and values, but needs help throughout to perform authentic tasks.
5. Emerging (E)	0%–39%	Learner is emerging with minimal understanding in terms of knowledge, skills, and values, but needs a lot of help.

In addition to the school-based assessment (SBA), a national standards assessment test is conducted in Basic 8 to provide national level indicators of learners' achievements.

Suggested time allocation

Four periods per week (each 50 minutes)

Suggested facilitators/teachers required for CT

How to use the time slot efficiently

Four periods per week (200 minutes) should be allocated in two double periods (100 minutes) so that practical aspects of the subject can be covered fully.

Two or more teachers are required to handle CT

The subject is initially designed to be managed by one teacher. However, two or more teachers will be required to handle the subject as most teachers do not have both Home Economics and pre-technical skills.

Pedagogical approaches

Pedagogical approaches include the approaches, methods, strategies, appropriate relevant teaching and learning resources that will help ensure that every learner benefits from the teaching and learning process.

Teachers should:

- use creative approaches to create learning-centred classrooms
- position inclusion and equity at the centre of quality teaching and learning
- use differentiation and scaffolding as teaching and learning strategies
- use information and communication technology (ICT) as a pedagogical tool
- identify subject-specific instructional expectations to make the subject relevant
- integrate all assessment strategies
- use questioning techniques that promote deep learning.

This Facilitator's Guide provides teaching methodology for lessons and concepts to ensure that teachers use the correct pedagogical approaches. However, an approach may have to be changed based on the skills levels of learners in a class. Teachers must use their own experience and discretion to adapt the methodologies as necessary.

Learning-centred pedagogy

A learning-centred classroom creates the opportunity for learners to engage in meaningful hands-on activities that relate what they are learning with the real world. Learners should discuss ideas, become actively engaged in looking for answers and work in groups to solve problems. They should also do research to find information, and analyse and evaluate information. The aim of the learning-centred classroom is to enable learners to take ownership of their learning.

Inclusion

Inclusion means ensuring access and learning for all learners particularly for learners who are disadvantaged. This book contains advice about how to teach a particular concept to large classes in lessons and to learners with special needs.

Differentiation and scaffolding

Differentiation is a process whereby teachers accommodate differences (in learning styles, interest and readiness to learn) between learners so that each learner has the best possible chance of learning. Differentiation can be applied to content, tasks, questions, outcomes, groupings and support. Scaffolding means breaking a task up into smaller units.

Technique	Process	Example
Differentiation by task	Teachers set different tasks for learners with different abilities.	When sketching, some learners can be asked to sketch freehand while others trace the outline of a diagram.
Differentiation by support	The teacher gives the support learners need.	The teacher refers learners who struggle to the Guidance and Counselling Unit for academic support.
Differentiation by outcome	The teacher allows learners to respond at different levels.	Learners who struggle with a topic are given more time for complicated tasks.
Scaffolding	The teacher uses a variety of instructional techniques to help learners make progress.	Break up a task, experience or concept into smaller parts and provide learners with the support they need to master each part.

Information Communication Technology (ICT)

Information Communication Technology (ICT) has been integrated into the Career Technology curriculum as part of the core of education, alongside reading, writing and numeracy. Thus, the curriculum is designed to use ICT as a teaching and learning tool to enhance deep and independent learning. For example, for certain topics, teachers can direct learners to use multimedia to support the teaching and learning process.

Expected outcomes

Improved outcomes include:

- improved teaching and learning processes
- improved consistency and quality of teaching and learning
- increased opportunities for more learner-centred pedagogical approaches
- improved inclusive education practices
- improved collaboration, creativity, higher order thinking skills
- enhanced flexibility and differentiated approach of delivery.

Using ICT as a teaching and learning tool gives learners access to large quantities of information online and offline. It also provides the framework for analysing data to investigate patterns and relationships. Once learners have made their findings, using ICT can help them organise, edit and print information in different ways.

Learners need to be exposed to different ICT tools including calculators, radios, cameras, cell phones, television sets and computers and related software such as Microsoft Office packages (Word, PowerPoint and Excel) as teaching and learning tools. The exposure learners are given from JHS 1 to JHS 3 (Basic 7 to Basic 9) to use ICT will build their confidence and increase their levels of motivation to use ICT in later years, both as a tool when studying and in life in general. ICT uses for teaching and learning is expected to enhance learners' quality and competence levels.

Organisation and structure of the curriculum

This guide follows the curriculum. The content has been organised under the key headings below. The content standards are organised by grade level. Within each grade level, the content is grouped by modules and then by topics that have related indicators:

- Modules refer to the main branches of the content.
- Topics are larger groups of related indicators. Indicators from different topics may be closely related.
- Content standards are groups of related indicators.
- Indicators are learning outcomes that define what learners should know and be able to do.

Basic 8: Curriculum coverage table

Module 1: Health and safety			
Content standards	Indicators	Page references	
		LB	TG
Topic 1.1: Personal hygiene and food hygiene			
B8.1.1.1 Demonstrate understanding of basic practices that depict personal and food hygiene.	B8.1.1.1.1: Demonstrate skills of personal hygiene.	2–4	1–4
	B8.1.1.1.2: Demonstrate skills in keeping food safe (food hygiene).	5–7	
Topic 1.2: Personal, workshop and food laboratory safety			
B8.1.2.1 Demonstrate knowledge of preventing accidents in the workshop/site/food/sewing laboratory.	B8.1.2.1.1: Demonstrate basic skills in applying first aid to self and others.	8–12	5–9
Topic 1.3: Environmental health			
B8.1.3.1 Demonstrate understanding of the basic concept of environmental health.	B8.1.3.1.1: Discuss the causal factors, effects and prevention of desertification and deforestation.	13–16	10–14
B8.1.3.2 Demonstrate understanding of basic ways of disposing of household and industrial/workshop/site/ laboratory waste.	B8.1.3.2.1: Identify proper management and disposal of household and industrial waste.	18–23	
Module 1 Revision answers		24	15

Module 2: Materials for production			
Content standards	Indicators	Page references	
		LB	TG
Topic 2.1: Compliant materials			
B8.2.1.1 Demonstrate understanding of the properties of compliant materials.	B8.2.1.1.1: Discuss the basic characteristics of compliant materials.	28–31	15–18
Topic 2.2: Resistant materials			
B8.2.2.1 Demonstrate understanding of properties of resistant materials.	B8.2.2.1.1: Explain the basic properties of resistant materials.	32–35	19–22
	B8.2.2.1.2: Describe the properties of building materials.	35–37	
Topic 2.3: Smart and modern materials			
B8.2.3.1 Demonstrate understanding of the use of smart and modern materials.	B8.2.3.1.1: Discuss smart and modern materials.	38–42	23–25
Topic 2.4: Food commodities (animal and plant sources)			
B8.2.4.1 Demonstrate understanding of the functions of food commodities.	B8.2.4.1.1: Explore the functions of food to the body.	43–45	26–28
Module 2 Revision answers		46	29

Module 3: Tools, equipment and processes

Content standards	Indicators	Page references	
		LB	TG
Topic 3.1: Measuring and marking out			
B8.3.1.1 Demonstrate understanding of measuring and marking out tools and equipment for production.	B8.3.1.1.1: Identify tools and equipment for measuring and marking out.	48–60	30–40
	B8.3.1.1.2: Take measurements of products/artefacts/articles.	61–65	
	B8.3.1.1.3: Use appropriate techniques to measure.	65–70	
	B8.3.1.1.4: Demonstrate how to care for and maintain measuring and marking out tools used for production.	71–73	
Topic 3.2: Cutting and shaping			
B8.3.2.1 Demonstrate understanding of cutting and shaping tools and equipment for making artefacts/products.	B8.3.2.1.1: Identify and use cutting and shaping tools and equipment.	74–79	41–48
	B8.3.2.1.2: Use appropriate techniques to cut and shape artefacts/products.	80–97	
	B8.3.2.1.3: Demonstrate how to care for and maintain shaping and cutting tools and equipment.	98–99	
Topic 3.3: Joining and assembling			
B8.3.3.1 Demonstrate understanding of joining and assembling materials, tools and equipment used for making artefacts/products.	B8.3.3.1.1: Identify joining and assembling materials, tools and equipment used for making artefacts/products.	100–107	49–55
	B8.3.3.1.2: Use appropriate tools, equipment and techniques to join and assemble patterns/artefacts/products.	108–116	
	B8.3.3.1.3: Demonstrate how to care for and maintain tools and equipment used for joining and assembling.	117	
Topic 3.4: Kitchen essentials			
B8.3.4.1 Demonstrate understanding of maintaining kitchen essentials.	B8.3.4.1.1: Demonstrate how to care for and maintain kitchen essentials.	118–120	56–59
Topic 3.5: Finishes and finishing			
B8.3.5.1 Demonstrate understanding of application of finishes.	B8.3.5.1.1: Demonstrate how to mix the various finishes.	121–122	60–62
	B8.3.5.1.2 Demonstrate skills of finishing edges of sewing articles and food products	123–126	
Module 3 Revision answers		127–128	63

Module 4: Technology

Content standard	Indicators	Page references	
		LB	TG
Topic 4.1: Simple structures and mechanisms, electric and electronic systems			
B8.4.1.1 Demonstrate understanding of application of principles of forces acting on structures.	B8.4.1.1.1: Perform experiments of principles of forces on structures.	131–139	64–69
	B8.4.1.1.2: Design and make simple school technology projects.	140–141	
Module 4 Revision answers		142	70

Module 5: Designing and making artefacts and products			
Content standards	Indicators	Page references	
		LB	TG
Topic 5.1: Communicating designs			
B8.5.1.1 Demonstrate understanding of drawing plane figures and solid objects using drawing instruments.	B8.5.1.1.1: Draw plane figures using instruments.	144–149	71–74
	B8.5.1.1.2: Draw objects in pictorial view using instruments.	150–153	
Topic 5.2: Designing			
B8.5.2.1 Demonstrate knowledge and skills of designing.	B8.5.2.1.1: Write a design brief.	154–155	75–80
	B8.5.2.1.2: Research into design problems.	156–157	
	B8.5.2.1.3: Write design specifications.	157–158	
	B8.5.2.1.4: Generate ideas/possible solutions.	158–159	
	B8.5.2.1.5: Make artefact using resistant materials.	159–160	
	B8.5.2.1.6: Test and evaluate made products/artefacts.	160	
	B8.5.2.1.7: Demonstrate basic skills in cutting out designs without patterns in sewing.	161–163	
Topic 5.3: Planning for making artefacts/products			
B8.5.3.1 Demonstrate understanding of planning for making artefacts/products and table setting.	B8.5.3.1.1: Plan and make wooden, metal/plastic artefacts.	164–169	81–87
	B8.5.3.1.2: Plan and make building artefacts.	170–173	
	B8.5.3.1.3: Plan to make sewing artefacts/products.	174–177	
	B8.5.3.1.4: Planning to set a table.	178–179	
Topic 5.4: Making artefacts from compliant, resistant materials and food ingredients			
B8.5.4.1 Demonstrate understanding of designing artefacts/products, and models and table setting.	B8.5.4.1.1: Demonstrate skills in table setting.	180	88–91
	B8.5.4.1.2: Demonstrate skills in making sewing artefacts/products using seams and arrangement of fullness.	181–187	
	B8.5.4.1.3: Make artefacts/products using wood, metal/plastics.	188	
Module 5 Revision answers		189–190	92

Module 6: Entrepreneurial skills			
Content standards	Indicators	Page references	
		LB	TG
Topic 6.1: Career pathways and career opportunities in Career Technology			
B8.6.1.1 Demonstrate knowledge of career opportunities in Career Technology.	B8.6.1.1.1: Explore the various career pathways and opportunities in Career Technology.	193–196	93–95
Topic 6.2: Establishing and managing a small business enterprise			
B8.6.2.1 Demonstrate understanding of establishing and managing micro and small business enterprises.	B8.6.2.1.1: Explain what is meant by micro, small and medium-sized business enterprises.	197–198	96–98
Module 6 Revision answers		199	98

The coverage table is based on the current three terms per year.

Allowance has been given for 7 weeks of exams (2, 2, 3). This means that 29 weeks of teaching (12, 10, 7) or 116 periods are allocated in the table.

However, depending on a teacher's district, municipal, metropolitan area, the subject coordinators will provide a scheme of learning for their schools to streamline the teaching and learning based on the curriculum.

The table gives the time allocation per topic.

Module	Topic	Time allocation
1. Personal hygiene and food hygiene	1.1 Personal hygiene and food hygiene	4
	1.2 Personal, workshop and food laboratory safety	4
	1.3 Environmental health	6
2. Materials for production	2.1 Compliant materials	6
	2.2 Resistant materials	8
	2.3 Smart and modern materials	4
	2.4 Food commodities (animal and plant sources)	2
3. Tools, equipment and processes	3.1 Measuring and marking out	8
	3.2 Cutting and shaping	8
	3.3 Joining and assembling	8
	3.4 Kitchen essentials	8
	3.5 Finishes and finishing	8
4. Technology	4.1 Simple structures and mechanisms, electric and electronic systems	6
5. Designing and making of artefacts and products	5.1 Communicating designs	10
	5.2 Designing	4
	5.3 Planning for making artefacts/products	4
	5.4 Making artefacts from compliant, resistant materials and food ingredients	10
6. Entrepreneurial skills	6.1 Career pathways and career opportunities	4
	6.2 Establishing and managing a small business enterprise	4
Total		116

Please note:

In the learning support material **Module** refers to **Strand** and **Topic** refers to **Sub-strand**.

Module 1 Health and safety

This module has three topics.

Topic 1.1 Personal hygiene and food hygiene

Content standard

- B8.1.1.1: Demonstrate understanding of basic practices that depict personal and food hygiene.

Indicators

- B8.1.1.1.1: Demonstrate skills of personal hygiene.
- B8.1.1.1.2: Demonstrate skills in keeping food safe (food hygiene).

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP5.1: Ability to combine information and ideas from several sources to reach a conclusion.
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.
- **Communication and collaboration (CC)**
 - CC8.1: Speak clearly and explain ideas.
 - CC8.2: Explain ideas in a clear order with relevant details.

1. Introduction

Viruses and bacteria can make us very sick. We can fight these germs by practising good hygiene and ensuring that our foods are clean at the place where we buy or receive the food until the last stage where the food is on our plates.

In this topic, we will look at ways in which we can practise food hygiene at home and elsewhere. Learners will role play a few of these practices.

2. Learning expectations

Learners need to be able to:

- Watch videos and pictures of the processes and skills of maintaining food hygiene and write down the observations.
- Role play the skills of food hygiene in class.

Duration

Teachers can teach this topic in four periods.

3. Resources

- Learner's Book
- Poster paper
- Personal protection equipment (PPE)
- Pictures of personal and food hygiene practices
- Videos about personal and food hygiene practices

4. Using ICT

Teachers can use cell phones, laptops, projectors and videos when teaching this topic.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Do research about personal and food hygiene practices.
- Collect and prepare teaching and learning resources such as pictures that are relevant to lessons, for example, prepare a chart about personal and food hygiene practices.

5.2 Teaching strategies

Role play, brainstorming, discussion (groups and whole class), group work, demonstrations, pair work

5.3 Relevant background knowledge

Learners have fair knowledge about personal and food hygiene. Some learners bath every day and wash their hands before they eat meals. All learners should brush their teeth in the morning and before going to bed, and wash their hands after they go to the toilet.

6. Suggested homework

Find out from people in your community what people do to prevent body odours.

7. Assessment

7.1 Assessment questions

1. Describe how body odours develop.
2. List and describe four ways in which people can prevent body odours.

Answers

1. Body odour develops as a result of sweat or perspiration. Sweat, or perspiration, comes from our glands. When we become teenagers, these glands become more active and we perspire more. Sweat is odourless. It is the bacteria that live on our skins that cause the smell when bacteria mix with sweat. Body odour is usually strongest from under the armpits and on the feet.
2. Ways in which we can prevent body odours (any four):
 - Wash regularly. The most important part of avoiding body odour is cleanliness. Wash thoroughly every day, especially the areas of the body where we tend to sweat. Use mild soap and warm water to wash away bacteria. If possible, use an anti-bacterial soap as you will stay cleaner for even longer. Wearing clean clothes also helps to prevent body odours.
 - Use lime or lemon to tackle body odour. Rub the juice on your armpits after you have cut the fruit into two halves. The acid in lemon juice kills bacteria.
 - Use baking soda to help absorb moisture from the skin and thus reduce odour. We can sprinkle a little baking soda under the underarms, and let it absorb the sweat. An equal mix of baking soda and lemon juice also works well. If the paste is a too thick, you can wash it off after a few minutes.
 - Apply deodorant roll-ons and sprays to prevent and get rid of the odour of sweat. You can buy deodorants in many forms including sticks, roll-ons, gels, sprays and creams. Deodorants that include antiperspirant on the label, also reduce the amount of sweat that the sweat glands produce. Deodorants that are not antiperspirants just disguise bad odours.

7.2 Reflective practice or diagnostic assessment exercises

1. How well did learners describe body odour?
2. Did learners list and describe four ways of preventing body odour correctly?

8. Answers

ACTIVITY 1.1

LB page 2

Learners discuss body odours in pairs of the same gender.

Teachers should guide learners when they answer the questions. Learners should treat each other with respect at all times. After a class discussion about ways to prevent or avoid body odours, teachers can discuss the information on pages 2 and 3 in the Learner's Book with the class.

ACTIVITY 1.2

LB page 4

1. Learners work in groups to demonstrate how to prevent body odours.
2. Learners prepare personal hygiene posters that explain the causes of body odours. Teachers can encourage learners to find information and pictures on the internet.
3. Each group of learners draws up a plan that can be used to inform others about ways to combat body odours. They present their plans to the whole class.

Teachers can use the rubric, *Poster* on page 101 in this book to assess groups' plans.

ACTIVITY 1.3

LB page 5

1. Learners work in groups to prepare lists of personal, food and kitchen hygiene rules. Answers may differ.
2. Learners watch videos or look at pictures that illustrate kitchen hygiene practices. They write notes.
3. Learners review the lists they drew up for question 1 making sure that they organise their work in the three categories: personal, food and kitchen hygiene.
4. Learners role play a food hygiene rule.
5. Learners discuss rules for refrigeration.

ACTIVITY 1.4

LB page 6

Learners work on their own.

1.
 - a) Store leftover chicken on the middle shelf in a fridge.
 - b) Store cashew nuts in a container with a lid.
 - c) Store raw mince on the bottom shelf.
 - d) Store an opened long-life milk container on the top shelf. Store unopened containers in a cupboard.
 - e) Store open chili sauce in the fridge door.
 - f) Store unopened tomato sauce in the cabinet.
 - g) Store fruit juice in the fridge door.
 - h) Store cooked fufu on the middle shelf.

2.	Reason for practice	Food hygiene practice
	a) Stray hairs can fall into food, carrying bacteria and other germs.	B Keep hair clean and covered with a cap or a net.
	b) Garments can carry germs from other physical contact.	F Wear a clean apron.
	c) Our hands constantly come into contact with bacteria.	A Wash hands regularly, always before and after handling food. Use warm water and soap. Take extra care after handling raw meat or fish.
	d) Long nails can hide dirt particles that contain bacteria.	C Cut or trim fingernails short.
	e) Earrings and rings can carry dirt and contaminate food; food can stick to them.	E Do not wear jewellery at work.
	f) The small particles that leave our mouths and noses contain viruses and bacteria.	D Sneeze and cough into a handkerchief

Linking Topics 1.1 and 1.2: Personal hygiene, food hygiene and safety

Questions

1. How does maintaining personal hygiene help keep food safe?
2. What might happen if you don't wash your hands properly before handling food?
3. Why is it important to keep a clean and safe workshop or food laboratory?
4. How can your knowledge of personal hygiene practices help treat a burn suffered while cooking?
5. Is there a connection between using deodorant and preventing workplace accidents?

Answers

1. Maintaining personal hygiene, especially by washing hands regularly, prevents the spread of bacteria that can contaminate food and cause illness.
2. Unwashed hands can transfer harmful bacteria to food, leading to foodborne illnesses.
3. A clean and safe workshop or food laboratory reduces the risk of accidents, injuries, and contamination of food or equipment.
4. Clean hands are essential for preventing infection in any wound, including a burn. Proper hygiene helps prevent additional bacteria from entering the wound.
5. While deodorant directly addresses body odour, it is indirectly related to workplace safety. Feeling fresh and comfortable can improve focus and reduce distractions, potentially leading to fewer accidents.

Teacher guidance for open-ended questions

- Question 5: Encourage students to consider the broader concept of "feeling prepared" for work.

Topic 1.2 Personal, workshop and food laboratory safety

Content standard

- B8.1.2.1: Demonstrate knowledge of preventing accidents in the workshop/site/food/sewing laboratory.

Indicator

- B8.1.2.1.1: Demonstrate basic skills in applying first aid to self and others.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP5.1: Ability to combine information and ideas from several sources to reach a conclusion.
- **Communication and collaboration (CC)**
 - CC8.1: Speak clearly and explain ideas.
 - CC8.2: Explain ideas in a clear order with relevant details.

1. Introduction

The ideal is to avoid accidents in workshops, work sites, food and sewing laboratories by handling tools and equipment carefully and correctly. When accidents do occur and people are injured, people who have been trained to administer first aid can often keep someone alive and prevent permanent injury until a doctor arrives at the scene. They can also help ensure that minor injuries do not become worse.

2. Learning expectations

Learners need to be able to:

- Understand the importance of using tools and equipment correctly.
- Understand how to prevent accidents in workplaces.
- Know how to administer first aid for cuts, falls, burns and scalds.
- Understand the importance of keeping someone who has been injured warm.
- Know how to administer CPR to someone who is struggling to breathe.

Duration

Teachers can teach this topic in four periods.

3. Resources

- Learner's Book
- First aid kit
- Pictures of bandages applied for cuts, burns and scalds
- Videos about administering first aid for cuts, burns and scalds, and falls
- Videos about administering CPR
- Demonstration by a trained medic

4. Using ICT

Teachers can use cell phones, laptops, projectors and videos when teaching this topic.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Do research about administering first aid.
- Take a first aid kit to class.
- Arrange for a medic to go to class and demonstrate how to treat cuts, burns and scalds.
- Arrange for a medic to demonstrate how to make someone who has fallen comfortable without risking further injury.
- Arrange for an experienced medic to demonstrate CPR.

5.2 Teaching strategies

Brainstorming, discussion (group and whole class), group work, demonstration, pair work

5.3 Relevant background knowledge

Learners will have seen first aid administered at home, at school or on the sports field. They will probably be familiar with how to apply bandages and plasters.

6. Suggested homework

Learners can speak to someone in their community who is an experienced medic, a nurse or a doctor about treating the type of injury someone could experience in a workshop. They can also speak to someone who works in a workshop about the preventative measures they take to avoid injury in a workshop, kitchen or sewing laboratory.

7. Assessment

7.1 Assessment questions

1. **a)** Which of the following items should be available in a basic first aid kit?
bandages, scissors, ointment, hand cream, crutches, plasters, thermometer, adhesive tape
b) Give reasons why you did not include all the items listed in question a) in your answer.
2. Do you think a medic should wear a face mask when treating someone who has been injured? Give a reason for your answer.
3. Identify five hazards in the workshop and/or in a food laboratory.
4. **a)** What is first aid?
b) State four benefits of learning first aid skills.
5. Describe how we can treat the following injuries in a food laboratory.
a) burns and scalds
b) falls and cuts
6. **a)** What is a first aid kit?
b) Give four examples of equipment you will find in most first aid kits.
7. Describe how people use the following equipment that is in a first aid kit.
a) adhesive tape
b) gauze pads
c) plasters
d) stretch or elastic bandage
8. Is the following statement correct?
A person who has first aids skills knows how to use the items in a first aid kit correctly.

9. Answer the questions about CPR.
 - a) What is CPR?
 - b) Give the meaning of each word: cardio, pulmonary and resuscitation.
 - c) When is CPR used and helpful?
 - d) How many steps are involved in CPR?
 - e) Name and explain the steps involved in CPR.
10. Name a disease that spread worldwide that is transmitted through the air.
11. Give the full form for the abbreviation CPR.
12. What are the three steps when administering CPR?

Answers

1. a) bandages, scissors, ointment, plasters, thermometer, adhesive tape
 b) Someone who has been injured may need ointment, but not hand cream. Crutches are too big to fit into a first aid kit.
2. Yes, a medic should wear a face mask to help ensure that he or she does not pick up an infection from an injured person and so that an injured person will not pick up an infection from the medic.
3. Hazards in workshops and food laboratories (any five): sharp tools, complicated machinery, gas equipment, electrical tools, poisonous substances, open flames, equipment and tools with sharp blades or needles that are operated at high speed or at high temperatures.
4. a) First aid is a basic medical care we give to someone who has been injured.
 b) Benefits of learning first aid (any four):
 - prevent an accident from resulting in death or permanent bodily harm
 - keep an injured person warm and safe until medical care is available
 - stop minor injuries from becoming worse
 - treat injuries such as cuts, scrapes, burns, bruises and sprains, which might not need any further medical attention.
5. Ways to treat injuries in a food laboratory:
 - Burns and scalds: Hold the injury under cool water. If possible, place the injured skin under a running tap, for 15 minutes. Do not use ice, iced water, creams or greasy substances such as butter. Apply a compress (a clean, cool, wet cloth) until the pain eases. Cover the injury with sterile gauze and not with fluffy cotton or adhesive plaster. Wrap gauze loosely to avoid putting pressure on the burnt skin. You can also cover the skin with a clean plastic bag.
 - Cuts: Rinse the cut with clean water; if possible, from a running tap. Apply pressure with sterile gauze, a bandage or a clean cloth until bleeding stops. Apply antiseptic cream to reduce the risk of infection and cover the cut with a sterile plaster.
 - Falls: Place a cold compress or ice pack on any bumps or bruises. You can keep it in place with elastic bandage. Wrap the bandage around the wound but not too tightly. Bandages may also be wrapped around a swollen ankle or knee. If the injured person is in a lot of pain, vomits or feels light-headed, he or she could have a broken bone. This type of injury will need further medical help.
6. a) A first aid kit is a box, bag or pack of supplies we use to treat injuries such as cuts, scrapes, burns, bruises and sprains.
 b) Examples of equipment in a first aid box (any four): adhesive tape, gauze pads, plasters, stretch bandage, scissors, safety pins, ointment, surgical gloves, antiseptic swabs and tweezers
7. a) Adhesive tape is thin sticky porous tape that is also called micropore. First aid workers use it to secure wound dressings.
 b) Gauze pads are packed in sterilised wrappings. First aid workers use them to stop bleeding, and to cover scrapes, cuts and burns. People often use gauze pads with adhesive tape to dress wounds.
 c) Plasters are adhesive strip dressings that are sometimes called band aids. You can buy plasters in different shapes and sizes. A strip of gauze is attached to a sticky backing. We use plasters for minor cuts and skin injuries. We cannot put plasters on burns.

- d) Stretch or elastic bandage are sold in rolls. We can use these bandages to reduce swelling around an injured joint and to keep an ice pack or a splint in place. We cannot put a bandage on an open wound.
8. The statement is true.
9. a) CPR is cardiopulmonary resuscitation.
b) *Cardio* refers to the heart, *pulmonary* refers to the lungs and *resuscitation* means to bring back.
c) A trained person can use CPR when an injured person has stopped breathing and his or her heart may have stopped beating to help him or her stay alive.
d) Three main steps are involved in CPR: C-A-B.
e) CPR can only be done by a person who has been trained:
- C refers to chest compressions. Chest compressions involve pressing on a person's chest many times in a row to move blood out of a heart that has stopped beating.
 - A refers to checking the airway. Checking the airway involves listening and looking to see if a person is breathing.
 - B refers to doing rescue breathing. Rescue breathing helps to move air into the lungs of a person who is not breathing.
10. Covid-19
11. C stands for cardio, P stands for pulmonary and R stands for resuscitation.
12. The three steps are called C-A-B:
- C Do chest compressions.
 - A Check the airway.
 - B Do rescue breathing.

7.2 Reflective practice or diagnostic assessment exercises

1. How well do learners understand the need to have certain items in a first aid kit?
2. How well do learners understand that many diseases are transmitted through the air?
3. Were learners able to identify five hazards in the workshop and food laboratory correctly?
4. a) How well did learners explain or define a first aid kit?
b) Were learners able to state four benefits of first aid skills correctly?
5. How well did learners describe burns and scalds, falls, cuts and how to treat these injuries in a food laboratory?
6. a) Did learners explain or define a first aid kit correctly?
b) How well did learners give four examples of equipment in first aid kits?
7. How well did learners describe the four types of equipment in first aid kits?
8. Did learners know that the statement is true?
9. a) Do learners know what the letters in CPR mean?
b) Do learners know what the words cardio, pulmonary and resuscitation mean?
c) How well did learners understand when it is useful to use CPR?
d) Do learners know that three steps are involved when applying CPR?
e) How well are learners able to explain the steps involved in CPR?
10. Do learners realise that Covid-19 spread worldwide from 2019 for a few years?
11. Do learners know what the abbreviation CPR means?
12. How well do learners understand the three steps (chest compressions, checking the airway and rescue breathing) and the reason for the order in which to administer the steps?

8. Answers

ACTIVITY 1.5

LB page 9

Learners work in groups.

1. Items in the first aid kit: scissors, gloves, roll of stretch bandage, safety pins, adhesive tape, ointment and adhesive plasters
2. Plastic or rubber gloves help ensure that someone who is giving first aid does not infect the person he or she is helping and also that he or she does not become infected.

ACTIVITY 1.6

LB page 11

Learners work in pairs.

1.
 - a) sterilised swab used to stop bleeding, and to cover scrapes and cuts: gauze pads
 - b) small strips of gauze attached to a sticky backing, used to cover open wounds: plasters
 - c) thin sticky porous tape used to secure wound dressings: adhesive tape
2. Learners take turns to demonstrate how to administer first aid to people who are affected by burns and scalds, cuts and falls.
3. Learners discuss the items to put into a first aid box.

Linking Topics 1.2 and 1.3: Personal safety and environmental health

Questions

1. How can your knowledge of first aid be helpful if you cut yourself working with a tool outside?
2. Why is it important to manage waste properly in a workshop or food laboratory?
3. How can the concept of “Reduce, Reuse, Recycle” help prevent accidents in the workplace?
4. How might deforestation impact the health and safety of people in a community?
5. Explain the connection between desertification and improper waste disposal practices.

Answers

1. Knowing basic first aid for cuts, such as cleaning the wound and applying a bandage, can help prevent infection and further injury.
2. Improper waste disposal in a workshop or food laboratory can create hazards like tripping or slipping, attract pests, and potentially contaminate food or equipment.
3. By reducing waste, there is less to dispose of, which reduces the risk of accidents associated with handling and transporting waste. Reusing and recycling materials minimises the need for potentially hazardous tools or equipment used in processing raw materials.

Teacher guidance for open-ended questions

- Question 3: Encourage students to think about the types of waste generated in a workshop or food laboratory.
- Question 5: Guide students to consider the impact of deforestation on soil health and erosion.

Topic 1.3 Environmental health

Content standard

- B8.1.3.1: Demonstrate understanding of the basic concept of environmental health.
- B8.1.3.2: Demonstrate understanding of basic ways of disposing of household and industrial/workshop/site/laboratory waste.

Indicators

- B8.1.3.1.1: Discuss the causal factors, effects and prevention of desertification and deforestation.
- B8.1.3.2.1: Identify proper management and disposal of household and industrial waste.

Core competencies

- **Communication and collaboration (CC)**
 - CC8.2: Explain ideas in a clear order with relevant details.
 - CC9.1: Demonstrate behaviour and skills of working towards group goals.
- **Critical thinking and problem-solving (CP)**
 - CP5.1: Ability to combine information and ideas from several sources to reach a conclusion.
- **Personal development and leadership (PL)**
 - PL6.2: Division of tasks into solvable units and assign group members to task units.

1. Introduction

In Basic 7, learners learnt that we obtain clean air, safe drinking water, and nutritious food and energy, from the environment. Our environment is often polluted and it can be dangerous to our health and to the health of other living creatures. The pollution of the environment has also led to desertification and deforestation. This topic focuses on the causal factors, effects and prevention of desertification and deforestation.

In this topic, learners will also learn about the proper management and disposal of household and industrial waste.

2. Learning expectations

Learners need to be able to:

- Identify the causal factors and discuss the effects and preventive measures of desertification and deforestation.
- Explain the terms desertification and deforestation.
- Research the causal factors, effects and preventive measures of desertification and deforestation and develop a folder and present project findings in a report for appraisal.
- Research the proper management and disposal of household and industrial waste.
- Discuss and report on the different ways of disposing of home and industrial waste.
- Discuss and report on the proper ways of disposing of household and industrial waste.
- Undertake a project about how to recycle waste at home and at school.

Duration

Teachers can teach this topic in six periods.

3. Resources

- Learner's Book
- Charts and videos about desertification, deforestation, proper management and disposal of home and industrial wastes as well as information about how to recycle waste at home and school
- Posters
- Cardboards, flip charts and colour markers

4. Using ICT

When teaching this topic, teachers and learners can use cell phones, laptops, projectors, audio portable speakers, flash drives, presentations using MS PowerPoint, and MS WordPads to help them design posters.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Read and find information about the causal factors, the effects and preventive measures of desertification and deforestation.
- Do research to find information about the proper management and disposal of household and industrial waste.
- Do research to find information about how to recycle waste at home and at school.
- Prepare teaching and learning resources (by preparing a few charts and obtaining videos).

5.2 Teaching strategies

Brainstorming, discussion (groups and the whole class), group work, pair work, role play, question and answer method

5.3 Relevant background knowledge

Learners have seen people cutting down trees for firewood and to produce charcoal and noticed how the environment is affected as a result of such human activities.

6. Suggested homework

Suggestions for additional activities for homework:

- Using MS WordPad, make a signpost with information that includes reasons why we should avoid desertification and deforestation.
- Write a project with title, Manage and dispose of household and industrial waste properly.
- Write a project with title, Recycling at home and at school.
- Imagine that you live in an area where trees are felled and processed into timber, but new trees are not planted. Assume you have been employed by the Environmental Protection Agency (EPA) to help solve this problem. Explain the approach you will use to address the problem.
- Imagine that you live in a community where hunting for meat is the main source of business in the community. Many people have unacceptable approaches to hunting, which includes using fire to hunt. Recently in your area, bush fires destroyed many farms. The result has been chaos in the community that has drawn the attention of the media and the government. If you were a representative from the Environmental Protection Agency that has been commissioned by the government to help curb the problem, explain how you will carry out this assignment.

- Imagine that over the past few years, your community was designated as one of the worst areas with regard to the disposal of household and industrial waste. Suggest ways in which this problem can be addressed.
- You think that your family needs to manage waste at home better. Suggest ways to your parents and siblings in which your household can recycle waste responsibly.

7. Assessment

7.1 Assessment questions

- a) Give two causes of deforestation.
 - b) Give two causes of desertification.
- a) List two effects of deforestation.
 - b) List two effects of desertification.
- a) Which two measures can be used to prevent deforestation?
 - b) Which two measures can be taken to prevent desertification?
- Explain the difference between household waste and industrial waste.
- a) In which two ways do people generally dispose of home and industrial waste?
 - b) List two proper ways of disposing of household and industrial waste.
- In which three ways can people reduce household and industrial waste?

Answers

- a) Mining, bush fires
 - b) Deforestation, urbanisation
- a) Polluted water bodies, global warming
 - b) Loss of plant species, climate change
- a) Alternative livelihood (agriculture), greening the environment
 - b) Afforestation, ruralisation
- Household waste is the garbage (such as leftover food, food packages, broken furniture, bent bicycle wheels) that is created by families.
Industrial waste is created by businesses and factories (examples include oil, poisonous liquids and big containers).
- a) Landfills, combustion
 - b) Sanitary landfill disposal and incineration disposal, recycle household and industrial waste
- Waste can be reduced or made less by buying fewer things, particularly packaged products. People can reuse cars, computers and cell phones. They can use recycled materials to make new items (for example, shopping bags can be made from recycled plastic and toilet rolls can be made using recycled paper).

7.2 Reflective practice or diagnostic assessment exercises

- How well did learners explain the terms desertification and deforestation?
- How well did learners identify the causal factors, effects and preventive measures of desertification and deforestation?
- How successfully did learners identify preventive measures people can take to avoid desertification and deforestation?
- How well did learners explain differences between household and industrial waste?
- How successfully did learners identify proper ways to manage and disposal of household and industrial waste?
- How well did learners identify different and proper ways of disposing of home and industrial waste?
- What problems did learners face when they recycled waste at home and in school?

8. Answers

ACTIVITY 1.7

LB page 16

Learners work in groups.

1. Answers may differ. For example, some people will cut down trees to make money or to provide wood for fuel for their families. Some people cut down trees to make space to plant crops and graze livestock.
 2. Answers may differ. Examples include that people can dry coconut husks and build biogas for cooking food.
- Teachers should encourage all learners to take part in discussions.

ACTIVITY 1.8

Project: Research desertification and deforestation LB page 16

Learners work in groups to do research about desertification and deforestation and prepare a project. Teacher should help groups draw up a timetable that includes the steps in the process and the date by which the project must be completed.

Teachers can use the rubric, *Role play* on page 101 in this book to assess groups' projects.

ACTIVITY 1.9

LB page 17

Learners work in pairs.

1. Learners discuss the types of waste they create at home including the items that form part of their garbage, where the items come from, how waste is created and whether they can reuse some items.
2. Learners give information about what they do with waste their households create.

ACTIVITY 1.10

LB page 19

Learners work in groups.

1. Combustion burns waste materials, releasing energy and often harmful byproducts. Controlled dumping, like in a landfill, isolates waste in a designated area to minimise environmental impact.
2. Landfills can leak toxic chemicals into the soil and water, creating harmful methane gas that contributes to climate change, and even attract pests and cause fires. Sanitary landfills attempt to address these problems by lining the dump with special materials to capture toxic liquid waste and methane gas, which can then be treated or used for energy.

ACTIVITY 1.11

Project: Research proper waste disposal system LB page 19

Learners work on their own to research a proper waste disposal system and draw labelled diagrams they can use to communicate the information they have found.

- 1–3. Teachers discuss the project with the class before they start working to ensure that learners understand the requirements.
4. Learners take turns to discuss their diagrams with the class.

Teachers can use the rubric, *Diagram: Proper waste disposal system* on page 99 in this book to assess learner's projects.

ACTIVITY 1.12 Project: School recycling plan

LB page 22

Learners work in groups to create a recycling plan for your school.

Teachers discuss the instructions with the class to ensure that groups understand what they need to do.

Teachers can use the rubric, *School recycling plan* on page 99 in this book to assess groups' recycling plans.

REVISION ANSWERS

(Learner's Book page 24)

1. B The bacteria on our skin mixes with our sweat. (1)
2. C Store raw chicken in a container with a lid. (1)
3. A It is a relaxed work environment with few rules. (1)
4. One way of preventing body odour is to ensure cleanliness. You can cut a lemon or lime in half and rub the juice of the fruit under your armpits. The acid in lemon or lime juice will kill bacteria. (3)
5. Four items that should be kept in a first aid box: adhesive tape, gauze pads, plasters and stretch bandages. (4)
6. C stands for chest compression, A stands for check airway and B stands for rescue breathing. (6)
7. People are using more and more of the earth's resources because the human population is growing. (1)
8. a) Deforestation is the process of cutting down or destroying all the trees in an area. (2)
b) Desertification is the process by which land becomes dry and empty so that trees and crops cannot grow there. (2)
9. a) True. (1)
b) False. Each household needs to recycle as much waste as possible and place items that cannot be recycled into waste bins. (1)
c) False. Burning waste is only a good option if it is done responsibly. (1)
d) True. (1)
e) True. (1)
f) True. (1)
10. Answers can differ, but should include recycling waste. Learners must include examples of ways in which people can reduce waste. (3)

Total: 30 marks

This module has four topics.

Topic 2.1 Compliant materials

Content standard

- B8.2.1.1: Demonstrate understanding of the properties of compliant materials.

Indicator

- B8.2.1.1.1: Discuss the basic characteristics of compliant materials.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP6.5: Ability to select alternatives that meet selected criteria adequately.
- **Communication and collaboration (CC)**
 - CC8.2: Explain ideas in a clear order with relevant details.

1. Introduction

In this topic, learners will identify the properties of paper and cardboard that make these items suitable for many uses. They will also describe the properties of fabrics and textiles that make them suitable to use for clothing and other items.

2. Learning expectations

Learners need to be able to:

- Give examples of items we can make using paper.
- Give examples of items we can make using cardboard.
- Explain why it is important that fabrics are absorbent.
- Explain why fabrics need to be durable.

Duration

Teachers can teach this topic in six periods.

3. Resources

- Learner's Book
- Photos of items that were made from compliant materials such as paper, cardboard and fabrics (such as nylon and cotton)
- Photos of items that were made from resistant materials such as plastic, wood, metal, ceramics and glass
- Videos that show how different compliant and resistant materials are used to make products

4. Using ICT

Teachers can use cell phones, laptops and projectors when teaching this topic.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Do research about compliant materials (such as paper, cardboard, fabrics and textiles).
- Do research about resistant materials such as plastic, wood, metal, ceramics and glass.
- Collect different items that were made from compliant and resistant materials to display in the classroom.
- Do research about the properties of building materials.
- Collect and prepare teaching and learning resources.

5.2 Teaching strategies

Role play, brainstorming, discussion (groups and whole class), group work, pair work and demonstrations

5.3 Relevant background knowledge

Learners have used items such as books and boxes for many years, and they have worn clothing all their lives.

6. Suggested homework

Teachers can ask learners to experiment with materials such as paper and fabric to see which materials absorb the most water and which materials are changed permanently by water.

7. Assessment

7.1 Assessment questions

1. Complete the sentences using words from the frame.

hard	soft	light	heavy	inflexible	flexible
------	------	-------	-------	------------	----------

- a) Compliant materials can be ..., ... and ...
 - b) Resistant materials can be ..., ... and ...
2. Choose five objects that are in your school bag or that you are wearing that are made using paper, cardboard or fabric. Give the material from which each object was made.
 3. What do paper towels, a cardboard box and a newspaper have in common?
 4. Why is cardboard suitable for making boxes in which to pack books?
 5. Give two examples of objects that are made using each type of paper.
 - a) Light weight paper
 - b) Medium weight paper
 - d) Heavy weight paper
 6. What is absorbency?
 7. Compare cotton and nylon by answering the questions.
 - a) What is the source of each material?
 - b) How absorbent is each material?
 - c) Compare the durability of cotton and nylon.

Answers

1. Compliant materials can be soft, light and flexible.
Resistant materials can be hard, heavy and inflexible.
2. Answers depend on the objects learners choose to classify.
3. The objects are all made from paper.
4. Cardboard is thick and strong.

5. Learners can give any two examples for each type of paper.
 - a) Tracing paper, tissue paper, toilet paper, paper towels, newspapers and wrapping paper
 - b) Photocopy paper and sketching paper
 - d) Construction paper, poster paper and paper used to make carry bags
6. Absorbency is the ability of a material to soak up liquid.
7. a) Cotton is a natural fibre that is made from the cotton plant.
Nylon is a man-made synthetic fibre.
 - b) Cotton has a high level of absorbency. It dries slowly.
Liquid cannot pass through nylon. It dries quickly. It remains strong when it is wet.
 - c) Cotton is not damaged by moderate heat, detergents and bleach, but it will be damaged when it is exposed to sunlight for long periods of time. It can shrink.
Nylon is very strong; it is resistant to wear and tear and it is colourfast. It is not easily damaged by exposure to sunlight.

7.2 Reflective practice or diagnostic assessment exercises

1. How well do learners understand the difference between compliant and resistant materials?
2. How well can learners identify the materials from which objects were made?
3. How well do learners understand the different types of paper?
4. How well do learners understand the properties of cardboard?
5. Can learners give examples the properties of different weights of paper?
6. How well do learners understand what absorbency is?
7. How well do learners understand the differences between cotton and nylon?

8. Answers

ACTIVITY 2.1 Practical: Classify compliant materials

LB page 26

Learners work in groups.

1. Learners sort objects their teachers give them into categories depending on the materials from which they were made.
2. Learners discuss the criteria they used to sort the objects into categories.
3. Learners take part in a class discussion about how their group classified the objects.

ACTIVITY 2.2

LB page 28

1. Learners' answers will differ based on the products they could list. Encourage learners to come up with as many products as possible. Check that learners have correctly categorised the products.

ACTIVITY 2.3

LB page 29

Learners work in pairs.

1. Learners discuss the type of paper they would use to make the artefacts shown in the photos.
Possible answers include the following.
 - a) Light weight tissue paper
 - b) Heavy weight poster paper
2. a) Tissue paper: ideal for gift wrapping, crafting, cleaning spills, and personal hygiene.
 - b) Photocopy paper: used in photocopiers, laser printers, and everyday document printing.
 - c) Corrugated cardboard: used for protective packaging of boxes and other goods.

Learners work in groups.

1. Clothes that are made using nylon will last longer than clothes that are made using cotton.
Nylon is very strong.
2. a) i) Parachutes need to be very resistant to wear and tear damage.
ii) Umbrellas must not let water or liquid pass through. Nylon can withstand watery conditions.
iii) Fishnets must not lose strength when they are submerged in water.
- b) i) Cotton ii) Cotton iii) Nylon

Linking Topics 2.1 and 2.2: Compliant vs. resistant materials

Questions

1. What properties would a packaging box for delicate fruit need to have? Why?
2. A metal spoon is a resistant material, but a plastic spoon can be compliant. Explain the difference in their behaviour.
3. Why do you think paper is not a suitable material for building a house?
4. How are the properties of sand important for a safe and strong building?
5. Can cardboard boxes be considered a resistant material in some situations? Explain.

Answers

1. The material would need to be compliant, meaning it can bend and absorb some impact to protect the fruit.
2. A resistant material like metal is strong and keeps its shape, while a compliant material like plastic can bend or flex under pressure.
3. Paper is not a resistant material; it can tear easily and cannot support heavy weight. Houses require strong and resistant materials to bear weight and withstand weather conditions.
4. Sand properties like good drainage and appropriate particle size are important for a strong foundation and for preventing cracks in the building.

Teacher guidance for open-ended questions

- Question 4: Ask students to consider the role of sand in concrete. How do the size and texture of sand particles affect the strength of the concrete mix? Can different types of sand have different properties?
- Question 5: Encourage students to think about the thickness and layering of cardboard in a box. Consider that compliant materials can be used in combination with resistant materials to create a stronger structure.

Topic 2.2 Resistant materials

Content standard

- B8.2.2.1: Demonstrate understanding of the properties of resistant materials.

Indicators

- B8.2.2.1.1: Explain the basic properties of resistant materials.
- B8.2.2.1.2: Describe the properties of building materials.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP5.1: Ability to combine information and ideas from several sources to reach a conclusion.
- **Communication and collaboration (CC)**
 - CC8.2: Explain ideas in a clear order with relevant details.

1. Introduction

In this topic, learners will learn about the physical properties (such as density, fusibility, electrical conductivity and thermal conductivity) of resistant materials. They will investigate properties such as strength, hardness, toughness, malleability, ductility and elasticity of resistant materials.

Learners will also work with the properties of building materials and the reasons for choosing different materials for projects.

2. Learning expectations

Learners need to be able to:

- Understand the difference between physical properties and working properties.
- Explain properties such as density, fusibility, electrical and thermal conductivity.
- Investigate the strength, hardness, toughness, malleability, ductility and elasticity of resistant materials.
- Describe the properties of cement, sand and stones.
- Discuss reasons for choosing different materials for building projects.

Duration

Teachers can teach this topic in eight periods.

3. Resources

- Learner's Book
- Poster paper
- Examples of resistant materials such as wood, metal, plastic, glass, ceramics, cement, sand and stone
- Examples of charts that give information about resistant materials

4. Using ICT

Teachers can use cell phones, laptops, projectors and videos when teaching this topic.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Collect bowls to take to class: one wooden bowl, one glass bowl and one ceramic bowl.
- Collect three spoons to take to class: one plastic spoon, one metal spoon and one wooden spoon.
- Do research about the properties of resistant materials.
- Collect and prepare resources such as examples of resistant materials before they have been used to make an item (such as a piece of wood) and examples of items (such as a wooden spoon).

5.2 Teaching strategies

Role play, brainstorming, discussion (groups and whole class), group work, pair work and demonstrations

5.3 Relevant background knowledge

Learners have used items that are made from resistant materials all their lives. In their homes, learners regularly use items that were made from plastic, wood, metal, ceramics and glass. They sleep on beds, drink water out of glasses and cut vegetables with knives that have metal blades and wooden handles.

6. Suggested homework

Learners can list five products at home that are made from each resistant material: plastic, wood, metal, ceramics and glass.

Learners can identify the visible building materials on two buildings. Examples can include stone and brick.

7. Assessment

7.1 Assessment questions

1. Look at the three bowls your teacher will show you.
 - a) Identify the material from which each bowl was made.
 - b) Which food could you serve in each bowl?
 - c) Give reasons for your answers to question b).
 - d) Which bowl should you wash and dry as soon as you have finished using it? Give a reason.
2. Answer the questions about the three spoons your teacher will show you.
 - a) From which material was each spoon made?
 - b) Discuss where you are likely to use each type of spoon.
 - c) Discuss the properties of each spoon.
 - d) Which type of spoon are you most likely to find at a recycling depot?
3.
 - a) List the physical properties of a piece of metal.
 - b) List the working properties of a metal shovel.
4. List three common building materials.
5. Is the following statement true? If not, correct it.

Sand and stone are pieces of rock. Sand particles are smaller than 5 mm in diameter and stone particles are bigger than sand particles and can be up to 50 mm in diameter.

Answers

1. Answers depend on the bowls the teacher shows the class. Example answers are given below.
 - a) One bowl was made from wood, one from glass and one bowl is a ceramics bowl.
 - b) You could serve salad or bread in a wooden bowl, salad or a hot meal in a glass bowl and a hot meal in a ceramics bowl.

- c) It is best to serve food that does not contain a lot of moisture in a wooden bowl.
You can serve both hot and cold food in glass and ceramics bowls.
- d) Wash the wooden bowl as soon as you have finished using it. Depending on its finish, a wooden bowl could be damaged by moisture.
- 2. a) Depending on the spoons the teacher shows the class, one spoon can be made from plastic, one from metal and one from wood.
- b) Plastic spoons are generally given to people when they buy fast food.
Metal spoons are often included in sets of cutlery that we use in our homes.
Wooden spoons are often used to serve salads.
- c) Plastic spoons are not very durable. They are often only used once. Metal spoons are very durable.
They conduct heat. A set of cutlery can be used in a family for generations.
Wooden spoons do not conduct heat. Wooden spoons should not be left in water.
- d) Plastic spoons are often recycled.
- 3. a) Metal has great density. It is fusible (can melt). Metal conducts electricity and it can transfer heat.
- b) A metal shovel is strong, hard and tough. It will not break easily and can have a sharp cutting edge.
- 4. Cement, sand and stone
- 5. True.

7.2 Reflective practice or diagnostic assessment exercises

1. How well do learners understand the differences between bowls made of different materials?
2. How well do learners understand the differences between wooden, metal and plastic spoons?
3. How well are learners able to distinguish physical properties from working properties?
4. Are learners able to list three building materials?
5. Do learners realise that the main difference between sand and stone is the size of particles?

8. Answers

ACTIVITY 2.5

Practical: Sort resistant materials

LB page 32

Learners work in groups.

1. Learners discuss and then draw up a checklist for resistant materials.
2. Learners take turns to answer the four questions about objects.
3. Learners separate the objects that are made from resistant materials from the rest of the objects.
They motivate their decisions clearly.
4. Learners take part in a class discussion and compare their findings with other groups.

ACTIVITY 2.6

Practical: Investigate working properties

LB page 34

Learners work in groups.

Each group selects three resistant materials to test in class to find out more about their working properties.

1. Learners discuss in their groups which materials are available and if they will be able to test the materials in class. They then select three materials.
2. Groups discuss how they will test each material for the six properties: strength, hardness, toughness, malleability, ductility and elasticity.
3. Learners test each material in class and complete the table on page 35 in the Learner's Book.

Learners work on their own.

1. Example answers are given in the table. Other properties and uses can be correct.

Building materials	Two properties	Two uses
Cement	Does not shrink much.	Mix cement with sand and water to form mortar.
	Reaches maximum strength after about three months.	Make concrete slabs, and build foundations, stairs and columns.
Sand	Bonds easily with cement and water.	Level floors and create base for paving.
	Is clean and does not contain salts.	Raise levels and fill gaps and holes.
Stone	Do not dissolve in water.	Build walls, columns and arches.
	Are clean and do not contain clay.	Attractive stones can be used for finishing on buildings.

2. Learners prepare charts that give the properties of building materials. They present their charts to the class for appraisal.
3. To make concrete, first prepare the cement; mix sand, gravel and water; add cement to the mixture.

Linking Topics 2.2 and 2.3: Resistant vs. smart materials

Questions

1. Why are resistant materials important in the construction industry?
2. Imagine you are building a bridge. What properties would your materials need to have?
3. List any everyday items that use both resistant and compliant materials.
4. Smart materials are often used in the healthcare industry. How could it benefit patients?
5. Name a situation where a resistant material might not be the best choice.

Answers

1. Resistant materials are strong, durable, and can withstand heavy loads, making them essential for safe and long-lasting buildings.
2. Strong and resistant materials are needed to support its weight and the weight of traffic.
3. Examples: chairs (resistant legs, compliant seat), shoes (resistant sole, compliant upper), sports equipment (resistant bat, compliant grip).

Teacher guidance for open-ended questions

- Question 4: Ask students to consider specific examples of smart materials in healthcare. Encourage students to think broadly about different areas of healthcare.
- Question 5: Prompt students to consider the weight and flexibility of materials. Give examples like using lightweight materials in aeroplanes or flexible materials for electrical wiring.

Topic 2.3 Smart and modern materials

Content standard

- B8.2.3.1: Demonstrate understanding of the properties of smart and modern materials.

Indicator

- B8.2.3.1.1: Discuss smart and modern materials.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP5.1: Ability to combine information and ideas from several sources to reach a conclusion.
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.

1. Introduction

Modern materials are developed by scientists. They have qualities that make them stronger, safer, lighter, tougher and more reliable than natural materials. Smart materials have properties that allow them to change in reaction to temperature, light and moisture.

2. Learning expectations

Learners need to be able to:

- Explain the differences between modern and smart materials.
- Give examples of areas where modern and smart materials are used.

Duration

Teachers can teach this topic in four periods.

3. Resources

- Learner's Book
- Poster paper
- Pictures of items made using modern and smart materials
- Items, such as sportswear, that are made using smart and modern materials
- Videos about items that change colour in different circumstances

4. Using ICT

Teachers can use cell phones, laptops, projectors and videos when teaching this topic.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Do research about items that are available locally that include modern and smart materials.
- Collect and prepare teaching and learning resources about modern and smart materials.
- Prepare a poster with examples of reversible materials.

5.2 Teaching strategies

Role play, brainstorming, discussion (groups and whole class), group work, pair work and demonstrations

5.3 Relevant background knowledge

Learners may have eaten foods that are made using modified starches (such as instant gravies) and seen smart fabrics in films.

6. Suggested homework

Learners can do research to find out which modern and smart fabrics are used in Ghana.

7. Assessment

7.1 Assessment questions

1. How do smart materials differ from modern materials?
2. Which example describes a reversible material?
A We can wear clothes that are made with smart materials back to front.
B A change in a material is changed back so that it looks the same as before the change.
3. Which products were made using smart materials?
A A spoon changes colour when it is put into hot food.
B Fire-resistant fabrics are used to make new hot air balloons.
C Clothing does not crease easily.
D A cell phone's screen repairs itself.
4. Which property of smart metals makes buildings safer when there are earthquakes?

Answers

1. Smart materials are reversible.
2. B
3. A, B and D
4. Some smart metals can change shape when under pressure. They will not break.

7.2 Reflective practice or diagnostic assessment exercises

1. How well do learners understand that not all modern materials are smart materials, but that all smart materials are modern materials?
2. How well do learners understand when a material is reversible?
3. Do learners realise that clothing that is made from a material that does not crease as easily as clothes that were made from a modern material that is not from a smart material?
4. How well do learners understand the difference between normal metals and smart metals that are used in the building industry?

8. Answers

ACTIVITY 2.8

LB page 38

Learners work in groups.

1. **a)** Groups discuss modern materials. Learners take turns to explain their ideas.
b) Examples of modern materials: breathable fabrics, deodorising materials, carbon fibre, Kevlar, graphene and reflective fabrics
2. Smart materials have all the properties of modern materials and they are reversible, meaning they can change back to their original properties.

ACTIVITY 2.9

LB page 42

Learners work in groups.

1. Each group works with one industry (food, textile, electronics, healthcare or building).
2. Learners do research to find information about the smart and modern materials that is used by the industry that has been allocated to their group.
3. Groups prepare a presentation for the class.
4. Groups prepare printed images or their own drawings to include with their presentations.

5. Groups present their findings to the class.

Teachers can use the rubric, *PowerPoint presentation/oral* on page 102 in this book to assess group's presentations. Learners do not have to present their findings in PowerPoint format.

ACTIVITY 2.10

LB page 42

Learners work in groups.

1.
 - a) Examples of how smart and modern materials can protect people include (any three):
 - Breathable fabrics draw sweat away from the body and can protect people from rain.
 - Fire-resistant fabrics can protect people against fire.
 - Drugs can be released into the bloodstream when infection is detected.
 - Metals can accommodate earthquakes and thus protect people.
 - Photochromic windows can protect people against very bright light.
 - b) Groups compare findings during a class discussion.
2.
 - a) Photochromic glass changes colour in response to the intensity of light. It is used in sunglasses and windscreens, which become darker when the light becomes brighter.
 - b) Thermochromic materials contain dyes that are made from liquid crystals. They change colour when the temperature changes and then change colour again to return to their original colour when the temperature changes again. (Thermo relates to heat and chromic tells you that a material contains chromium or that it is derived from chromic acid.)
3. Examples of smart and modern materials in different communities will differ.
4.
 - a) Groups discuss materials they would like to invent.
 - b) Groups discuss their invention with the class.

Linking Topics 2.3 and 2.4: Smart materials and food

Questions

1. Think about the different functions food provides for the body (body-building, energy-giving, protective). Name smart materials that could enhance these functions.
2. Smart materials are sometimes used in food packaging. Why might this be beneficial compared to traditional packaging materials?
3. We learned about different materials used in the building industry. Name smart materials that could be used to create a more sustainable building for food storage or processing.
4. Imagine you are a food scientist developing a new type of clothing that helps people regulate their body temperature. How might smart materials be used in this clothing?
5. Some smart materials can react to changes in the environment. How could this property be useful in the food industry, beyond packaging?

Answers

1. Students might suggest smart materials that release nutrients based on body needs (body-building), change colour to indicate spoilage (protective), or generate heat for better cooking (energy-giving).
2. Smart packaging can monitor freshness, indicate temperature changes, or destroy harmful bacteria.

Teacher guidance for open-ended questions

- Question 3: Encourage students to consider materials that might improve energy efficiency or reduce waste in food storage or processing facilities.
- Question 4: Ask students to think about the ideal temperature range for human comfort.
- Question 5: Guide students to consider how materials that react to light, pressure, or temperature could be used (indicate food spoilage, prevent contamination, improve food preparation techniques).

Topic 2.4 Food commodities (animal and plant sources)

Content standard

- B8.2.4.1: Demonstrate understanding of the functions of food commodities.

Indicator

- B8.2.4.1.1: Explore the functions of food to the body.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.
- **Creativity and innovation (CI)**
 - CI5.2: Ability to merge simple/complex ideas to create novel things.

1. Introduction

We need many different nutrients every day to stay healthy. Nutrients are the substances in food that help the body grow and help our bodies to be strong and protect us against diseases. Without good nutrition, we cannot develop our full potential. In this topic, learners will look at the basic functions of food and relate different food commodities to their functions.

2. Learning expectations

Learners need to be able to:

- Classify food according to their basic functions.
- Relate food commodities to their functions.
- Draw a chart of the three functions of food commodities to display for appraisal.

Duration

Teachers can teach this topic in two periods.

3. Resources

- Learner's Book
- Poster paper
- Pictures of body-building, energy-giving and protective foods

4. Using ICT

Teachers can use cell phones, laptops, projectors, flash drives, PowerPoint presentations and videos.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Do research about food commodities and their functions.
- Collect and prepare teaching and learning resources such as pictures that illustrate body-building and energy-giving and protective foods.

5.2 Teaching strategies

Role play, brainstorming, discussions (groups and whole class), group work, pair work and demonstrations

5.3 Relevant background knowledge

Learners eat foods that are body-building, energy-giving and protective.

6. Suggested homework

Identify food commodities from the three functional groups at home.

7. Assessment

7.1 Assessment questions

1. State the three functions of food commodities.
2. Classify food into three functional groups.
3.
 - a) What is the chief nutrient found in body-building foods?
 - b) What roles does this chief nutrient play in our bodies?
 - c) What are foods called that are rich in this chief nutrient?
 - d) Give eight examples of foods that contain this chief nutrient.
4. Give two functions of body-building foods.
5. Give two functions of energy-giving foods.
6. List the two main types of energy-giving foods and give three examples each type of food.
7.
 - a) Which nutrients do protective foods contain?
 - b) What is the function of protective foods?
 - c) Give examples of protective foods.

Answers

1. The three functions of food commodities:
 - stay alive, be active, move and work
 - repair body cells and build new cells
 - stay healthy; prevent and fight infections.
2. The three functional groups of food:
 - body-building foods
 - energy-giving foods
 - protective foods.
3.
 - a) Protein
 - b) Protein helps our body repair cells and make new cells.
Protein promotes growth and development in children, teenagers and pregnant women.
 - c) Body-building foods
 - d) Chicken, red meat, fish, shellfish, eggs, seeds, nuts, dairy (milk, cheese and yogurt) and legumes (beans and lentils)
4. Body-building foods:
 - help our bones and muscles to grow
 - help to repair our body after work or exercise.
5. Energy-giving foods:
 - act as fuel for our bodies, for example, they help us walk, run and play
 - give us the ability to work, for example, they help us do manual work and they help us to concentrate.

6. Energy-giving foods can be divided into two main groups:
 - Starches (grains and starchy vegetables) and sugar; examples include cassava, yam, maize, millet, potatoes, beans, wheat, bread, rice, sugars, sweet fruit and honey
 - Fats and oils; examples include butter, palm oil, cream, margarine, nuts and seeds.
7.
 - a) Protective foods contain vitamins and minerals.
 - b) Protective foods protect the body against disease and infections.
 - c) Examples of protective food: vegetables and fruits

7.2 Reflective practice or diagnostic assessment exercises

1. How well were learners able to name the three functions of food commodities?
2. Did learners classify food correctly into three functional groups?
3.
 - a) Were learners able to name the chief nutrient found in body-building foods?
 - b) How well did learners give the functions of the chief nutrient in body-building foods?
 - c) Were learners able to identify foods that are rich in body-building nutrients?
 - d) How many examples could learners give of foods that are body-building?
4. How well did learners give two functions of body-building foods?
5. Were learners able to give two functions of energy-giving foods?
6. How well were learners able to list the two main types of energy-giving foods and give three examples of each?
7.
 - a) Did learners name the nutrients that protective foods contain?
 - b) How well did learners give the function of protective foods?
 - c) How well did learners give examples of protective foods?

8. Answers

ACTIVITY 2.11

LB page 44

Learners work on their own.

1. Plant sources: seeds, nuts and legumes (beans and lentils)
Animal sources: chicken, fish, shellfish, eggs, dairy (milk, cheese and yogurt)
2. Learners work out how many portions of protein they ate in the previous two days.

ACTIVITY 2.12

LB page 45

Learners work in pairs.

1. Learners discuss the vegetables and fruits in the photos, how their family prepares the foods and the fruit they ate the previous day.
2. Answers may differ. Example answers are given below.
 - a) Animal-sourced food with body-building and energy-giving functions: meat, fish and chicken
 - b) Plant-sourced food with body-building and energy-giving functions: legumes
 - c) Plant-sourced food that is body-building, energy-giving and protective: nuts and seeds
3. Learners draw a chart that shows the three functions of food commodities and includes examples.
Learners display their charts in class and explain their charts to the rest of the class.

Teachers can use the rubric, *Chart: Three functions of food commodities* on page 100 in this book to assess each pair's chart.

1. B We can easily fold, bend, cut and shape compliant materials. (1)
2. C paper (1)
3. B Paper types vary in weight. (1)
4. C We need many different nutrients in order to stay healthy. (1)
5. It may be dangerous to work with resistant materials as we need tools to bend or change the shape of resistant materials. We can be injured when cutting a resistant material. We could be burnt when using an open flame in a laboratory to heat a resistant material. (4)
6. Below are example answers.
 Modern materials are developed by people. They have qualities that make them stronger, safer, lighter, tougher and more reliable than natural materials. Modern materials have special properties at all times.
 Examples of modern materials: breathable fabrics that are used to make sportswear and antibacterial wound dressing textiles
 Smart materials are modern materials that have properties that allow them to change in reaction to temperature, light and moisture. They can also change properties back to their original state when circumstances change.
 Examples of smart materials: highly fire-resistant fabrics that are used to make firefighters clothing and very strong lightweight textiles that are used to make bullet-proof vests (4)
7. Ways in which modern and smart materials can protect people (any three with examples):
 - Clothing that changes colour when light intensifies can protect us from UV exposure.
 - Sanitised fabrics that are used to make socks can kill bacteria and prevent odour.
 - Antibacterial wound dressings can protect people from infections.
 - Highly fire-resistant fabrics can protect firefighters from fire.
 - Very strong lightweight textiles that are used to make bullet-proof vests can protect people.
 - Drugs can be released into the bloodstream to fight a new infection.
 - Car windows that darken in response to bright light can protect people's eyes against the bright light. (6)
8. Three functions of food to the body:
 - Foods help us stay alive, be active, move and work.
 - Foods repair body cells and build new cells.
 - Foods help us stay healthy, and help us prevent and fight infections. (3)

9.

Starches	Fats	Proteins
cassava	cream	fish
maize	margarine	lamb
rice	palm oil	lobster

(9)

Total: 30 marks

Module 3 Tools, equipment and processes

This module has five topics.

Topic 3.1 Measuring and marking out

Content standard

- B8.3.1.1: Demonstrate understanding of measuring and marking out tools and equipment for production.

Indicators

- B8.3.1.1.1: Identify tools and equipment for measuring and marking out.
- B8.3.1.1.2: Take measurements of products/artefacts/articles.
- B8.3.1.1.3: Use appropriate techniques to measure.
- B8.3.1.1.4: Demonstrate how to care for and maintain measuring and marking out tools used for production.

Core competencies

- **Communication and collaboration (CC)**
 - CC8.2: Explain ideas in a clear order with relevant details.
 - CC9.1: Demonstrate behaviour and skills of working towards group goals.
- **Critical thinking and problem-solving (CP)**
 - CP5.1: Ability to combine information and ideas from several sources to reach a conclusion.
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.
- **Creativity and innovation (CI)**
 - CI5.2: Ability to merge simple/complex ideas to create novel situations or things.
 - CI6.3: Ability to use tools effectively for working.
 - CI6.10: Reflect on work and explore thinking behind thoughts and processes.

1. Introduction

In order not to waste materials, time and resources, it is always best to measure and mark or set out accurately so that you will have precise artefacts, articles and products in the world of work. We use measuring and marking or setting out tools and equipment to take exact measurement. We also need to record the precise size and shape of each workpiece and the materials we need in the food industry (kitchen), sewing, wood, metal and plastic workshops and at building sites. When measuring and marking or setting out, we need to consider:

- taking precise portions as spelt out by recipes
- reading dimensions from sketches or drawings accurately
- selecting appropriate tools and equipment for the tasks and materials
- using tools and equipment correctly and accurately
- checking measuring and marking and setting out to ensure accuracy.

Learners are generally proud and happy to manipulate measuring and marking out tools. It is essential that learners know how to use these tools well as they will use them when designing products.

Creating artefacts in sewing is fundamental for every learner. This topic will allow learners to explore different tools they will use when measuring and marking out in a sewing workshop.

In the kitchen, we weigh and measure the food ingredients we use to prepare food. Learners will use marking out tools such as knives to show where to cut ingredients.

For all length measurements, learners will measure millimeters (mm), centimetres (cm) and metres (m). In the food laboratory, they will measure mass and volume using measuring metal, plastic and wooden measuring tools such as cups, spoons and scales. Learners will measure mass in kilograms (kg), grams (g) and volumes in millilitres (ml) and litres (ℓ). Measuring is important in the food laboratory.

The focus of this topic is:

- identifying tools and equipment for measuring and marking out with emphasis on sketching and labeling parts
- taking measurements of products, artefacts and articles
- using appropriate techniques to measure
- demonstrating how to care for and maintain measuring and marking out tools used for production.

2. Learning expectations

Learners need to be able to:

- Describe the procedure for measuring and marking out artefacts, articles and products at building sites, and in wood, metal and plastic workshops.
- Sketch and label parts of measuring and marking out tools and equipment.
- Present sketches of tools and equipment for measuring and marking or setting out for appraisal.
- Demonstrate how to handle a tape measure to take measurements in millimetres.
- Demonstrate how to mark out measured part(s) of artefacts.
- Demonstrate how to record measured part(s) of artefacts.
- Demonstrate how to indicate dimensions on marked out part(s) of artefacts.
- Care for and maintain measuring and marking out tools and equipment and share experiences from home about how to care for tools and equipment for production.
- Discuss inaccuracies when using faulty measuring tools and equipment or instruments that have been tampered with and realise how this will affect people.
- Measure objects or materials, and make models or mock-ups using compliant and resistant materials.
- Develop a plan and organise community education that will address the issues of using measuring tools that are faulty because someone has tampered with them.
- Identify cleaning agents or materials we can use to clean and maintain tools and equipment based on the materials from which tools and equipment were made.
- Discuss the importance of taking body measurement in sewing.
- Discuss guidelines for taking body measurements.
- Take each other's body measurement for garment construction.
- Identify measuring and marking out tools from charts or realia that are used to produce products in the food laboratory (kitchen).
- Describe the processes people use to measure and mark out products in a food laboratory (kitchen).
- Use tape measures, rulers, scales and handy measures such as spoons and jugs to measure liquids, dry ingredients, objects and other materials.
- Measure the ingredients for a pancake, and make the pancake.
- Display pancakes for appraisal.

Duration

Teachers can teach this topic in eight periods.

3. Resources

- Learner's Book
- Charts of artefacts with dimensions and marking out
- Pictures of measuring and marking or setting out tools and equipment
- Real-life objects (measuring and marking or setting out tools and equipment)
- A4 sheets of paper, flip charts and cardboard
- Specimen workpieces or artefacts and materials
- Videos about procedures for measuring and marking out in all trade areas

4. Using ICT (where relevant)

Use laptops, projectors, pen drives, the internet, and PowerPoint presentations to demonstrate taking body measurements, and how to use measuring and marking out tools and equipment.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Read and research information about measuring and marking out artefacts, articles and products at building sites, and in wood, metal and plastic workshops.
- Demonstrate sketching and labelling measuring, marking and setting out tools and equipment.
- Prepare resources (charts, PowerPoint presentations, artefacts, workpieces, materials, videos).
- Do research about how to measure objects or materials, and make models or mock-ups using compliant and resistant materials.
- Learn, research and demonstrate how to:
 - handle a tape measure to take measurements in millimetres
 - mark out measured part(s) of artefacts
 - record measured part(s) of artefacts
 - indicate dimensions on marked out part(s) of artefacts
 - care for and maintain measuring and marking out tools and equipment
 - develop a plan and organise a community education session to address the issues of using measuring tools that are faulty or that have been tampered with
 - handle inaccuracies in using measuring tools and equipment that are faulty or have been tampered with and realise how this affects people.
- For further information visit websites such as:
 - <https://www.youtube.com/user/woodwork>
 - <http://www.woodworkersjournal.com>.
- Look for additional information on the internet about how to:
 - take body measurements
 - use measuring and marking out tools when making sewing articles.

5.2 Teaching strategies

Brainstorm, discussions (group and class), group work, pair work, question and answer technique

5.3 Relevant background knowledge

Learners used measuring and marking or setting out tools and equipment in Basic 7.

Learners have been wearing dresses and shirts and they have used rulers in class for many years.

- Teachers can ask learners to find out in their communities if people have used measuring tools that are faulty or with which someone has tampered. Learners can describe such measuring tools to the class.

6. Suggested homework

1. Explain the terms procedure and artefact.
2. Give reasons why we start working with information that is available when we work on a project.
3. Briefly describe the procedures for measuring and marking out artefacts in each area.
 - a) building sites
 - b) wood workshops
 - c) metal or plastic workshops
4. Search for information about measuring and marking out tools and equipment in each area.
 - a) building sites
 - b) wood workshops
 - c) metal or plastic workshops
5. Search for information about how to convert imperial measurement units into metric system units and metric units into imperial units.
6. Make a freehand sketch of each measuring and marking or setting out tool or piece of equipment. Label two parts on each tool.
 - a) surveyor's tape
 - b) builder's square with calibrations
 - c) spirit level
 - d) straight edge
 - e) steel ruler with calibrations
 - f) line and pins
 - g) tape measure
 - h) try square
 - i) marking gauge
 - j) callipers

7. Assessment

7.1 Assessment questions

1. Explain each term.
 - a) marking out
 - b) setting out
2. Give **two** reasons why we do the following when we start to produce a product.
 - a) measuring
 - b) marking out
 - c) setting out
3. List four things to consider when you measure out something.
4. List procedures you will use to mark out parts you have measured.
5. Briefly explain how to use each cleaning agent or material.
 - a) Silvo
 - b) Brasso
 - c) oil
 - d) cloth
6. Why must we ensure that measurements are accurate?
7. List five general rules to observe when caring for and maintaining measuring and marking out tools.
8. How will you clean tools that are made from materials such as metals, plastics and wood?
9. Name four tools we use when measuring and marking out in a sewing centre.
10. Give two reasons why it is necessary to use measuring and cutting out tools when sewing.
11.
 - a) How many types of measuring cups do we use in kitchens?
 - b) What types of measuring cups do we use in kitchens?
12. Which measuring cup should we use to measure ingredients that are not really dry, but that are also not liquids, such as butter?
13. As a caterer, how would you control the amount of food that will be served at an event?
14.
 - a) Explain portion control.
 - b) Explain portion.
 - c) How does one determine what size portion is correct?
 - d) Do the sizes of portions vary? Explain.
 - e) What are the standard portions of rice and porridge?
15. How do you calculate quantities for a prepared dish?
16. Determine the number of slices of bread you will need to serve fifty (50) participants at a workshop.
17. What is the most important part of portion control?
18. Identify two key things you need to do when you measure out ingredients according to a recipe.

Answers

1.
 - a) Marking out is transferring measurements, sizes and shapes from drawings unto a material such as wood, metal or plastic.
 - b) Setting out is transferring the measurements, sizes and shapes of a structure onto drawings or onto the ground.
 2.
 - a) We measure to make sure that we have accurate dimensions and so that we will not waste materials.
 - b) We mark out to provide guidelines for our work and to provide the control size and shape of the workpiece we can use to ensure accuracy, and so that we can control of the position and size of a hole or the requirements of any feature.
 - c) We set out to ensure straightness, squaring, accuracy so that we will obtain the correct shape.
 3. When measuring out (any four):
 - Know each tool and where you should use it.
 - Read dimensions from drawings or sketches accurately.
 - Use the correct tools for each job. Do not compromise.
 - Know how to use each tool correctly and accurately.
 - Review any measuring and marking or setting out you have done to check if it is accurate.
 4. Procedures to follow when marking out:
 - Use the appropriate tools to measure and mark out the main outline of the pattern.
 - Use the right tools to ensure that the right angles and curve measurements are accurate.
 - Provide allowance for cutting in order not to reduce the size of a workpiece.
 5.
 - a) Use Silvo to clean silver.
 - b) Use Brasso to clean brass.
 - c) Apply oil to prevent rust.
 - d) Use a cloth for cleaning and dusting.
 6. Wrong measurements can affect the quantity and quality of products and works.
 7. General rules to observe when caring for and maintaining measuring and marking out tools:
 - Store tools away after use to keep them free of dust and grime. Never store dirty tools.
 - Store tools in a dry place because dampness can cause metals to rust and weaken the wooden parts of tools such as handles and then they can rot or split.
 - Thoroughly dry tools you have washed before you store them to prevent moisture damage.
 - Use a soft cloth to dust tools often to keep them dust-free.
 - Do not leave tools, including steel kitchen utensils, lying in water for long periods of time to prevent wooden parts of tools from cracking and metal parts from being stained and rusting.
 - Avoid hard cleaning equipment that can damage tools. Use soft cloths, brushes and sponges.
 - Ensure that cloths, brushes and sponges are clean before you use them.
 - Choose the correct cleaning agent (soaps or polish) for each job. Check the labels of cleaning agents and make sure you are using the correct products and not something that could scratch or stain the material you are cleaning.
 8. When cleaning wood:
 - Clean wooden tools with warm, soapy water and a sponge or brush.
 - Do not leave wooden tools lying in water for a long time – the wood will crack.
 - Oil wooden tools using cooking oils for kitchen tools and machine oils in other workshops.
 - At least once a year, use a cloth to oil wooden handles thoroughly. Rub the oil along the wooden handle and then leave it to dry.
 - Treat the wooden handles of metal tools in the same way you would treat wooden tools.
- When cleaning plastic:
- Use a sponge or a brush and hot, soapy water to clean food particles and greasy substances from measuring tools. Do it before the food hardens and stains the plastic.
 - In the workshop, also use a sponge and warm soapy water to get rid of greasy substances on plastic rulers or handles.
 - Use a soft cloth and baking soda to polish plastic.

When cleaning metal:

- Metals such as stainless steel and copper can scratch easily. Do not use cleaning equipment that can scratch these materials, such as steel wool. Use a soft sponge or a cloth.
 - Wipe metal tools with a clean cloth in the direction of the grain to avoid leaving streaks.
 - Wash very dirty metal tools in soapy water, but dry them thoroughly to avoid rust. Dry them after you have finished washing them to prevent stains from dirty water and leftover cleaning agents.
 - Use special metal polishes such as Brasso and Silvo to remove stains, dirt, tarnish and grease build-up. Brasso is a bit more abrasive and harsher than Silvo and you cannot use it on soft metals such as gold and silver. You can use both polishes on brass, copper, chrome and steel.
 - Oil the metal parts in tools regularly. A light film of oil will prevent rust, and keeps the moving parts working smoothly. Wipe the tools with a clean rag. Use cooking oils in a kitchen and machine oils in other workshops.
9. Tape measure, metre ruler, tailor's chalk, pencil
 10. It is used to measure out required lengths and also to mark out desired shapes or patterns.
 11. a) There are two types of measuring cups.
b) We use dry and liquid measuring cups.
 12. Use dry measuring tools or a scale to measure ingredients such as butter.
 13. Use portion control to control the amount of food to be served at an event.
 14. a) Portion control refers to counting how many people in total will eat at a function, measuring how much food is needed per person and calculating how much food is needed in total in order to avoid waste or shortage.
b) A portion is the right amount of food per person.
c) We determine the correct amount by looking at what is healthy and necessary for nutrition. We also look at what amount will be filling without being too much.
d) Portions vary, according to how old and how active a person is.
e) Standard portion of rice per person: $\frac{1}{2}$ cup (4 oz or 115 g)
Standard portion of soup or porridge per person: two ladles
 15. To calculate quantities for a prepared dish, multiply the number of people who will eat the food by the standard measurements per person.
 16. To feed one person, you will need two slices of bread.
So, to feed 50 people, you will need $50 \times 2 = 100$ slices of bread
 17. The most important part of portion control is using the right measuring tools.
 18. Measure the ingredients and use the correct measuring tools.

7.2 Reflective practice or diagnostic assessment exercises

1. How well were learners able to explain the terms marking out, setting out and datum?
2. Were learners able to give two reasons for each procedure: measuring, marking out and setting out?
3. How well were learners able to list four things to consider when measuring out something?
4. Were learners able to list five procedures to use when marking out parts they measured?
5. How well do learners understand the cleaning agents or materials we use to clean and maintain tools and equipment based on the materials from which tools are made?
6. How well do learners understand the importance of taking accurate measurements?
7. Could learners list rules for caring and maintaining measuring and marking out tools?
8. Could learners explain how to clean metal, plastic and wooden tools?
9. Were learners able to list four tools we use when measuring and marking out for sewing?
10. How well do learners understand why we use measuring and marking out tools when sewing?
11. a) How many learners know that we use two types of measuring cups in a kitchen?
b) How well did learners identify the types of measuring cups?
12. Did learners know which tool to use when measuring an ingredient such as butter?

13. How well do learners understand how to control the amount of food to be served at an event?
14.
 - a) How well did learners explain portion control?
 - b) How well did learners explain portion?
 - c) How well do learners understand what a correct portion size is?
 - d) How well did learners explain that portion sizes vary?
 - e) Did learners give the correct standard portions of rice and porridge?
15. Do learners know how to calculate quantities of food needed to feed a number of people?
16. How well did learners calculate the number of bread slices needed to serve fifty (50) people?
17. How well did learners state or explain the most important part of portion control?
18. How well did learners identify two key things to do when measuring ingredients to follow a recipe?

8. Answers

ACTIVITY 3.1 Practical: Measure food ingredients

LB page 50

1. Learners work in groups to measure different food ingredients.
2. Learners discuss how well they measured out amounts of food.
3. Learners identify the measuring tools they used and indicate what they need to remember when using a tool.

ACTIVITY 3.2

LB page 50

Learners work on their own.

1. Learners sketch a liquid measuring cup and calibrate every 50 ml. They show 200 ml of liquid inside the cup.
2. Learners sketch a kitchen scale with an empty container on it.
3. You can measure half a cup by using a 250 ml measuring cup or by using a 125 ml cup and measuring out the ingredient twice. Other answers may also be correct.

ACTIVITY 3.3

LB page 53

Learners work in pairs.

1.
 - a) Learners discuss processes people follow to take measurements before cutting fabric.
 - b) Steps in the correct order:
 - Use a tape measure to take body measurements.
 - Use a tape measure or a metre ruler to measure how much fabric is needed.
 - Use a tape measure to measure pattern pieces.
 - Lay out the fabric.
 - Lay out the pattern pieces.
 - Use tailor's chalk or a tracing wheel to transfer measurements to the fabric.
2. Learners draw and label sketches to show how to use a tracing wheel to mark out fabric.
3. Each pair presents their sketches to the class for appraisal.

ACTIVITY 3.4

LB page 55

Learners work in groups.

1. Learners discuss the processes construction workers are carrying out.
 - a) A shows workers bonding a wall.
B shows workers levelling the ground.
C shows workers checking if a wall is plumb.
 - b) In A, workers are using a trowel and a wooden float.
In B, workers are using surveyor's tape.
In C, workers are using a spirit level.
2.
 - a) Learners discuss the processes construction workers follow when they take measurements before and while they build a structure.
 - b) Steps in the correct sequence:
 - Measure the boundary lines.
 - Build a frame.
 - Build the outside walls.
 - Mark out the foundations.
 - Lay the foundation.
 - Build the inside walls.
 - c) Learners sketch and label one measuring or making tool.
Group members show their sketches to their group and explain how to use the tool.

ACTIVITY 3.5

LB page 57

Learners work in groups.

1.
 - a) Learners check if the sides of an artefact are straight and flat.
 - b) Learners mark out a cutting line that is 43 cm from the edge of a piece of timber.
2. Learners discuss the process of measuring accurately with a tape measure. They identify mistakes people can make and how to avoid making these mistakes.

ACTIVITY 3.6

LB page 58

Learners work on their own.

1. Learners watch videos that show how to use marking tools when working with wood. Learners choose one tool to sketch. The sketch shows the tool used in the video they watched.
2. Learners present their sketches for appraisal.

ACTIVITY 3.7

LB page 60

Learners work in groups.

1. Learners demonstrate and explain differences in measuring and marking out a sheet of plastic.
2. Learners discuss how to measure and mark out the material to produce each item: a) plastic face visors, b) flat metal discs and c) plastic cutting boards.
3. It is easier to mark a centre point on wood so that you can draw an accurate arc than it is to mark a centre point on plastic or metal.
4. A the internal diameter of the steel artefact
5. It is easier to make a mark with the scribe than with a pencil.
6.
 - a) B
 - b) B The steel ruler is too thick to give an accurate reading when it is flat. It will be easier to take an accurate reading if the steel ruler is at a 90° angle to the workpiece.

ACTIVITY 3.8

LB page 60

Learners work on their own.

1. Learners choose one tool that is used in a plastics and metal workshop. They do research to find the process for which the tool they chose is used. Each learner draws a labelled sketch that explains the process.
2. Learners present their sketches to the class.

ACTIVITY 3.9 Practical: Take each other's body measurements

LB page 63

Learners work in groups of three with learners of the same gender.

- 1,2. Learners take turns to take body measurements.
3. Learners compare measurements.

ACTIVITY 3.10 Practical: Use a tape measure to take measurements LB page 64

Learners work in pairs.

1. Learners follow the given steps to practise using a tape measure.
2. Learners measure three objects and record the measurements.

ACTIVITY 3.11 Project: Use measurement tools to calculate portions LB page 66

Learners work in groups.

1.
 - a) Yam: dry measuring cup or measuring scale
 - b) Milk: liquid measuring cup with a spout
 - c) Rice: dry measuring cup or measuring scale
 - d) Soup: ladle
2. Quantities of ingredients needed to serve five people:
 - a) Yam: $1 \text{ cup} \times 5 = 5 \text{ cups}$ ($8 \text{ oz} \times 5 = 40 \text{ oz}$ or $220 \text{ g} \times 5 = 1\,100 \text{ g}$)
 - b) Milk: $1 \text{ cup} \times 5 = 5 \text{ cups}$
 - c) Rice: $\frac{1}{2} \text{ cup} \times 5 = 2\frac{1}{2} \text{ cups}$ ($4 \text{ oz} \times 5 = 20 \text{ oz}$ or $115 \text{ g} \times 5 = 575 \text{ g}$)
 - d) Soup: $2 \text{ ladles} \times 5 = 10 \text{ ladles}$
3. Learners measure out quantities to serve five portions.

ACTIVITY 3.12 Practical: Make pancakes

LB page 67

Learners work in groups, pairs or on their own.

Learners measure, mix and make pancakes.

ACTIVITY 3.13

LB page 68

Learners work in groups, pairs or on their own.

1. Learners display their pancakes for appraisal.
a,b) Learners ask others to rate their pancakes.
c) Learners suggest ways in which their pancakes can be improved.
2. If their pancakes were not good, learners describe what they think they did wrong.

ACTIVITY 3.14 Practical: Make a model of an artefact

LB page 69

Learners work on their own.

Learners decide of which artefact to make a model. They decide how much smaller to make their models. Learners sketch their designs, calculate and record the dimensions of their models. Learners prepare the tools they will use to make the artefacts. They make the artefacts. Learners appraise each other's models. Learners use feedback on their models to write an appraisal of their model.

ACTIVITY 3.15 Project: Community education

LB page 70

Learners work in groups.

1. Learners discuss the consequences of using faulty measurement tools.
2. Groups work out a plan to address the issue of faulty measurement tools in their communities.
3. Learners decide how to work with community members.
4. Learners share and discuss their plan with the rest of the class.
5. Learners implement their plans.

ACTIVITY 3.16

LB page 71

Learners work in groups.

1. Learners discuss how they care for measuring and marking out tools at home. Teachers encourage learners to listen to others and learn from other their experiences.
2. Learners discuss caring for metal and fabric measuring tapes, and steel and plastic rulers.

ACTIVITY 3.17 Practical: Clean measuring and marking out tools

LB page 73

Learners work in pairs.

1. Learners clean a marking out knife following the five steps that are given in the question (which include using Brasso).
2. Learners use the same steps to clean a weighing scale pan using Silvo.
3. We use Brasso to clean knives and Silvo to clean weighing pans. Brasso is more abrasive than Silvo. Knives will not be damaged if you use Brasso to clean them, but a weighing pan could be damaged if you use Brasso to clean it.

Learners work in pairs.

1.
 - a) Frequently apply a thin layer of oil to a knife and a weighing pan to prevent rust.
 - b) Wash and dry a tool with a wooden handle immediately after use, and then oil the handle.
 - c) When the measurements someone takes using a poorly maintained measuring tools are not correct, an artefact can be assembled incorrectly, food may not taste good and a garment can fit poorly.
 - d) An abrasive cleaner can damage the calibrations on a steel ruler.
 - e) We dry metal tools to remove water or solvent residue and prevent rust.
2. Answers may differ. Answers can include baking soda, white vinegar, washing soda, corn starch, lemon and rubbing alcohol.
3.
 - a) Mineral oil or beeswax compound are suitable to maintain wooden parts.
 - b) Machine oils and grease can be used on wooden parts of tools in a metal workshop.
4. Mineral oil and beeswax compound are edible and can be used to oil tools that are used in a kitchen. Tools in a metal workshop can be oiled with oils and grease that are not edible.

Linking Topics 3.1 and 3.2: Measuring and marking for cutting and shaping

Questions

1. Why is it important to measure and mark accurately before cutting or shaping materials in different workshops (food lab, sewing, woodworking, etc.)?
2. How does measuring play a role in the successful outcome of a food dish?
3. Why are accurate body measurements important for a well-fitting piece of clothing?
4. Why is measuring and marking essential for sawing and carving used in woodworking?
5. How can measuring and marking be crucial for accurate bending or cutting of metal sheets in a metal workshop?

Answers

1. It ensures the final product is the correct size, shape, and functions as intended.
2. Incorrect measurements of ingredients can affect the taste, texture, and overall success.
3. Accurate body measurements ensure the garment fits well and comfortably.

Teacher guidance for open-ended questions

- Question 4: Consider the specific applications of measuring and marking in each technique.
- Question 5: Encourage students to think about the consequences of inaccurate measurements in metalwork. Discuss specific tools used for marking and measuring in metal workshops (e.g., rulers, marking gauges).

Topic 3.2 Cutting and shaping

Content standard

- B8.3.2.1: Demonstrate understanding of cutting and shaping tools and equipment for making artefacts/products.

Indicators

- B8.3.2.1.1: Identify and use cutting and shaping tools and equipment.
- B8.3.2.1.2: Use appropriate techniques to cut and shape artefacts/products.
- B8.3.2.1.3: Demonstrate how to care for and maintain shaping and cutting tools and equipment.

Core competencies

- **Communication and collaboration (CC)**
 - CC 8.2: Explain ideas in a clear order with relevant details.
- **Critical thinking and problem-solving (CP)**
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.
- **Creativity and innovation (CI)**
 - CI5.2: Ability to merge simple/complex ideas to create novel situations or things.
 - CI6.10: Reflect on work and explore thinking behind thoughts and processes.

1. Introduction

In this topic, learners will learn about cutting and shaping tools in general. Cutting and shaping tools are devices we can use to reduce materials to desirable sizes and shapes. These tools include bolsters, brick hammers, firmer chisels, jack planes, rip saws, cold chisels, hacksaws and hand files. In this topic, the focus is on sketches and descriptions of tools, and the uses, care and maintenance of the tools and equipment. Further emphasis is placed on appropriate techniques we can use to cut and shape artefacts and products.

In a sewing centre, it is essential to use cutting and shaping tools effectively. Learners, therefore, need to acquire knowledge about how to use cutting and shaping tools efficiently.

We cut and shape ingredients to desired sizes and shapes in a food laboratory. For example, we chop, slice and dice vegetables. We can shape some food items without cutting when we use the shape of a tin or a mould. For example, when you bake bread in a loaf tin or bake cake in a patty tin, the bread and cake will have the shape of the tin in which it was baked. In this topic, we will look at cutting and shaping tools in general.

2. Learning expectations

Learners need to be able to:

- Identify cutting and shaping tools and equipment used at building sites, wood workshops, metal and plastics workshops, and food laboratories (such as kitchen knives, cake tins and moulding bowls).
- Discuss the uses of the different types of cutting and shaping tools.
- Sketch and label cutting and shaping tools and display sketches for appraisal.
- Use appropriate techniques to cut out a design at building sites, wood workshops, metal and plastics workshops, and food laboratories.
- Discuss how to care for and maintain cutting and shaping tools and equipment that are used at building sites, wood workshops, metal and plastics workshops, and in food laboratories.
- Display projects for appraisal.
- Discuss how to care for and maintain cutting and shaping tools and equipment.

Duration

Teachers can teach this topic in eight periods.

3. Resources

- Learner's Book
- Charts about artefacts with information about cutting and shaping tools and equipment also in sewing centres
- Cutting and shaping tools such as bolsters, brick hammers, firmer chisels, jack planes, rip saws, cold chisel, hacksaws and hand files
- A4 sheets of paper, flip charts, pieces of cardboard, brown paper and poster paper
- Examples of workpieces or artefacts and materials including dresses and shirts
- Videos that demonstrate appropriate techniques to use when using cutting and shaping tools to make artefacts and products
- Personal protection equipment (PPE)
- Pictures of cutting and shaping tools

4. Using ICT

When teaching this topic, teachers can use laptops, projectors, pen drives, PowerPoint presentations, and MS WordPads to sketch the cutting and shaping tools and equipment.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Read and research information about cutting and shaping tools and equipment including their uses and sketches.
- Prepare teaching and learning resources (such as charts and PowerPoint presentations, and find real-life objects, artefacts or workpieces and materials, and videos).
- Do research about how to cut or shape workpieces.
- Do research about how to use appropriate techniques to shape a design on building sites, wood workshops, and metal and plastics workshops.
- Do research about how to care for and maintain cutting and shaping tools and equipment that is used on building sites, wood workshops and metal and plastics workshops.
- Read and research information about cutting and shaping tools and equipment.
- Research and practise cutting and shaping articles for which workers use cutting and shaping tools.
- Prepare teaching and learning resources (charts, PowerPoint presentations, specimens, and videos).
- Look for additional information on the internet.
- Collect and prepare teaching and learning resources such as pictures that are relevant to lessons, for example, to prepare a chart with information about cutting and shaping tools.

5.2 Teaching strategies

Discussions (group and whole class), group work, pair work, role play, brainstorming, demonstrations

5.3 Relevant background knowledge

Learners have fair knowledge about cutting and shaping. For example, they have used tables, chairs, pencils, and worn dresses and shirts, and they have been eating food that has been cut and shaped. Learners have basic knowledge about cutting and shaping tools that are used in sewing workshops. Learners have used cutting and shaping tools at home and also at school.

6. Suggested homework

1. Make a freehand pictorial sketch of each tool and label its parts. If possible, use an MS WordPad.
 - a) bolster
 - b) brick hammer
 - c) firmer chisel
 - d) cold chisel
 - e) hacksaw
 - f) hand file
 - g) Jack plane
 - h) rip saw
2. Write down **eight** steps to follow when using a rip saw to rip a piece of timber.
3. Why should we not oil files?
4. Use cutting and shaping tools to help you sketch a design on a paper and cut it out.

7. Assessment

7.1 Assessment questions

1. Give one use of each cutting and shaping tool and piece of equipment.
 - a) bolster
 - b) brick hammer
 - c) firmer chisel
 - d) cold chisel
 - e) hacksaw
 - f) hand file
 - g) jack plane
 - h) rip saw
 - i) gouges
2. List two types of backsaws.
3. Explain why workers rub candle wax on the sole of a jack plane.
4. Which tool do we use to cut pieces of fabric?
5. Why is it necessary to use cutting tools when you sew?
6. Which tool can we use to draw the curves of necklines and hiplines in a sewing workshop?
7. Why do we use shaping tools in a sewing workshop?
8.
 - a) Give two reasons why foods are shaped in a kitchen?
 - b) Give examples of foods that are shaped for practical reasons in a food laboratory.
 - c) Give examples of foods that are shaped for decorative reasons in a food laboratory.
9. We can cut leafy green vegetables, such as spinach, into long, thin strips. What are these strips called?
10. What is the general rule for caring for and maintaining cutting and shaping tools?
11. What does it mean to sharpen a tool?
12. How will you care for a kitchen knife and a biscuit cutter?

Answers

1.
 - a) Bolsters are used to split open bricks and blocks to create the required sizes and shapes.
 - b) Brick hammers are used to chip off edges or small pieces of rock. They are also used to cut stone, brick and concrete, without using a chisel.
 - c) Firmer chisels are used for paring, which means cutting of small shavings of wood using only hand pressure on the chisel.
 - d) Cold chisels are used to cut, shear and chip metal and stone.
 - e) Hacksaws are used to make straight, neat cuts on metal and plastic.
 - f) Hand files are used to file stepped work where vertical edges must not be filed.

- g) Jack planes are used to flatten and smooth rough pieces of timber.
 - h) Ripsaws are used to saw along the grain of wood. (This is called ripping.)
 - i) Gouges are used to remove excess wood quickly and to create hollows.
2. Tenon saw and dovetail saw
 3. Rubbing candle wax on the sole of a jack plane makes the jack plane glide easily.
 4. Scissors
 5. We use cutting tools to cut out pieces of fabric into desired parts for stitching. We also cut off pieces of thread after sewing seams.
 6. French curves
 7. We use shaping tools to draw lines or curves so that it will be easy to cut and stitch fabric.
 8.
 - a) Food is shaped for practical and decorative reasons.
 - b) Examples of foods that are shaped for practical reasons include *banku*, *omo tuo* and chocolate bars.
 - c) Examples of foods that are shaped for decorative reasons include shaped fruit pieces, moulded desserts, cakes and vegetables.
 9. The strips are called chiffonade.
 10. Care for and maintain cutting and shaping tools by:
 - keeping tools dry and dust-free
 - oiling the metal parts regularly
 - sharpening the tools regularly to prevent them from becoming blunt.
 11. When you sharpen a tool, you grind and shave off bits of a blade to produce a new, sharp edge. You can use a grindstone or, for certain tools, you can use a file.
 12. Guidelines for caring for kitchen knives:
 - Sharpen knives more regularly than workshop tools. If you sharpen blades regularly, they will last longer.
 - Use a honing rod to straighten the edge of a kitchen knife blade and make the blade straight and sharp again.
 - Never cut on a marble countertop, glass plate, ceramic baking tray, steel tray and another surface that was not designed for cutting.
 - Do not use the blade edge of the knife to scrape vegetables or other ingredients off a cutting board. Simply turn the blade around and use the spine of the knife.
 - Do not store knives in a drawer. When knives are moved around and rubbed against other, utensils inside the drawer will damage the delicate blades.

Guidelines for caring for biscuit cutters:

- Remove food particles, particularly from corners.
- Wash biscuit cutters in warm detergent water, rinse thoroughly and dry thoroughly.
- Use fine steel wool to remove rust.
- Oil biscuit cutters to prevent rust.

7.2 Reflective practice or diagnostic assessment exercises

1. How well were learners able to discuss the uses of the cutting and shaping tools and equipment?
2. Were learners able to name tenon and dovetail saws?
3. Do learners know that rubbing candle wax on the sole of a jack plane makes the jack plane glide easily?
4. Do all learners know that we use scissors to cut fabric?
5. How well do learners understand that we need to use cutting tools when we sew?
6. Do learners know that we use French curves to draw curved necklines and hiplines?
7. How well do learners understand that we use shaping tools to draw lines that make it easy to sew in the correct places?
8.
 - a) Do learners understand that food is shaped for practical and decorative reasons?
 - b) Could learners give examples of foods that are shaped for practical reasons?
 - c) Could learners give examples of foods that are shaped for decorative reasons?

9. Do learners know what the word, chiffonade, means?
10. How well did learners explain how to care for and maintain cutting and shaping tools generally?
11. How well did learners explain what it means to sharpen a tool?
12. How well did learners explain how to care for a kitchen knife and a biscuit cutter?

8. Answers

ACTIVITY 3.19

LB page 74

Learners work in pairs.

1.
 - a) You can use a hand file to smooth rough edges when working with wood.
 - b) You can use a mallet and a chisel to cut or chip stone.
 - c) You can use a hand saw to cut wood.
2. Learners check their answers.

ACTIVITY 3.20

LB page 79

Learners work in groups.

Learners prepare presentations about how to use cutting and shaping tools (hand files, firmer chisels, hacksaws, jack planes, rip saws, mallets, bolsters, brick hammers, backsaws and cold chisels) by following instructions in the activity.

ACTIVITY 3.21

LB page 79

Learners work on their own.

1. Learners copy and complete the table as instructed in the activity.

	Wood workshop	Building site	Metal/plastic workshop
Hand file	✓		✓
Firmer chisel	✓		
Hacksaw			✓
Jack plane	✓		
Ripsaw	✓		
Mallet	✓		✓
Bolster		✓	
Brick hammer		✓	
Backsaw	✓		
Cold chisel		✓	✓

2. Learners sketch and label three cutting and shaping tools.

ACTIVITY 3.22

LB page 80

Learners work in groups.

Learners discuss how to make *banku* balls and shape *aparansa* and *tuo zaafi*.

ACTIVITY 3.23

LB page 83

Learners work on their own.

Each learner chooses a basic pattern, lays the pattern out on fabric, cuts the fabric out and displays fabric pieces for appraisal.

ACTIVITY 3.24

LB page 84

Learners work in pairs.

The two links show videos that show how to use French curves:

- <https://youtu.be/4vgtS-HT9xs>
- https://youtu.be/aHejBDA_xYQ

Remind learners to follow the steps on page 84 and the example on page 85 in the Learner's Book when they use French curves to draw a pattern.

ACTIVITY 3.25

LB page 85

Learners work on their own.

Learners adapt a pencil shirt pattern to make a flared skirt. Learners design a bodice. They display their patterns in class and explain the techniques they used.

ACTIVITY 3.26

LB page 87

Learners work on their own.

1. Learners draw a rough design for a house with the focus on the shapes of walls, the roof and the rooms.
2. They describe the materials and techniques they would use to shape the design and they insert details on their drawings.

ACTIVITY 3.27 Practical: Make a knife-holder

LB page 88

Learners work on their own.

Learners study the knife-holder design plan that is given in the activity and follow the instructions to make a knife-holder.

ACTIVITY 3.28

LB page 89

Learners work in pairs.

1.
 - a) The shape of the wooden fish imitates the shape of a real fish.
 - b) The boats are narrow at the front and back so they can move easily in water.
 - c) The rolling pin has a cylindrical shape so that you can use it to roll dough.
 - d) The artistic artefacts are shaped to show people and to remain upright.
 - e) The mask is shaped to look like a human face in the front and it is flat at the back so that you can hang it on a wall.

- f) The bowl is round so that it will be easy to mix food in it. The spoon is rounded at the bottom so that you can use it to mix food.
2. Learners work through the instructions for carving a wooden spoon on page 90 in the Learner's Book. They identify and discuss instructions they do not understand initially including challenges they may have to face when making the artefact. Learners also discuss safety measure they need to take to avoid injury when creating the artefact.

ACTIVITY 3.29 **Practical: Design and shape a wooden spoon**

LB page 90

Learners work on their own.

Each learner designs and shapes a wooden spoon by following the instructions in the Learner's Book.

ACTIVITY 3.30 **Practical: Practise wood planing**

LB page 91

Learners work in pairs.

The teacher demonstrates how to plane wood.

1. Learners practise using a jack plane to smooth a surface.
2. Groups check each other's technique and give advice, if necessary.

ACTIVITY 3.31

LB page 93

Learners work in pairs.

1. Learners identify the types of moulds that were used to make three plastic artefacts.
 - a) Hot plastic is injected into a mould. The mould is then pressed closed.
 - b) Hot plastic is injected into a mould. The size of the cup depends on the size of the mould.
 - c) To make blister packaging, a sheet of plastic is moulded into a shape that includes bubbles. The plastic is stuck to another material after a tablet or capsule has been put into each blister.
2. Learners draw a design for a plastic artefact that can be shaped using line bending.

ACTIVITY 3.32 **Practical: Design and cast a paperweight**

LB page 94

Learners work on their own.

The teacher demonstrates and guides learners following instructions to design and cast a paperweight.

ACTIVITY 3.33

LB page 95

Learners work in pairs.

1. Learners draw and make a design for a metal artefact that can be shaped using bending, beating and forging after the teacher has demonstrated the techniques.
2.
 - a) When bending metal, place the metal in a vice and strike it with a mallet. Strike the metal at an angle so that you will have a straight and not a wavy edge.
 - b) When beating a metal, soften the metal, place it on a sandbag and then strike it with a rubber mallet.
 - c) When forging metal, place heated metal in an anvil and hit it with a heavy hammer.

ACTIVITY 3.34 Practical: Make a metal or plastic bookend

LB page 97

Learners work on their own.

Learners follow instructions to make metal or plastic bookends.

ACTIVITY 3.35

LB page 97

Learners work in groups.

1. Teacher organises an exhibition of the artefacts learners produced for appraisal.
2. Learners discuss questions about how the artefacts were made, the focus of each design and whether they think the artefact was made successfully according to the design.

Linking Topics 3.2 and 3.3: Cutting, shaping and joining**Questions**

1. Imagine you are making a wooden stool. How would the cutting and shaping techniques be used before the joining and assembling stage?
2. Think about preparing vegetables for a salad. How might measuring, cutting, and shaping be important before assembling the salad?
3. In sewing, different stitches are used for joining pieces of fabric. Why do you think choosing the right stitch is important for a strong and neat final product?
4. Consider the different materials used for joining in various workshops (sewing - thread, woodwork - glue, metalwork - welding). How might the material properties influence the choice of joining technique?
5. Think about shaping techniques used in metalworking (bending, filing). How could these techniques be a form of joining different pieces of metal together?

Answers

1. Cutting and shaping the wood for the legs, seat, and any other components would be done before joining them together for the final stool.
2. Measuring ensures equal portions, cutting allows for desired shapes, and shaping can create decorative elements for the salad.
3. The right stitch provides strength and prevents the fabric from tearing at the seams, ensuring the garment holds its shape and lasts longer.

Teacher guidance for open-ended questions

- Question 4: Ask students to consider the specific properties of each joining material. How does thread's flexibility differ from glue's adhesive properties? How does welding create a permanent bond compared to glue? Encourage students to think about the application and purpose of the final product when choosing a joining technique.
- Question 5: Guide students to consider how bending and filing can be used to create interlocking shapes. Provide examples of metal objects where bending or folding creates a join (e.g., hinges, brackets). Discuss how filing can smooth edges for a seamless connection between metal pieces.

Topic 3.3 Joining and assembling

Content standard

- B8.3.3.1: Demonstrate understanding of joining and assembling materials, tools and equipment used for making artefacts/products.

Indicators

- B8.3.3.1.1: Identify joining and assembling materials, tools and equipment used for making artefacts/products.
- B8.3.3.1.2: Use appropriate tools, equipment and techniques to join and assemble patterns/artefacts/products.
- B8.3.3.1.3: Demonstrate how to care for and maintain tools and equipment used for joining and assembling.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.
- **Creativity and Innovation (CI)**
 - CI5.2: Ability to merge simple/complex ideas to create novel situations or things.
 - CI6.10: Reflect on work and explore thinking behind thoughts and processes.

1. Introduction

In Basic 7, learners learnt about joining and assembling materials and tools. The focus of this topic is to identify joining and assembling materials, tools and equipment used for making artefacts and products; use appropriate tools, equipment and techniques to join and assemble patterns, artefacts and products; and demonstrate how to care for and maintain tools and equipment used for joining and assembling.

We measure, mark out, shape or cut certain foods when we prepare dishes in a food laboratory. The next step is to join and assemble cut materials using binders or binding agents.

2. Learning expectations

Learners need to be able to:

- Identify materials, tools and equipment used for joining and assembling artefacts and products from displayed charts, pictures or realia, building site, wood, and metal and plastic workshops.
- Sketch and label joining and assembling tools at building sites, and in wood, metal and plastic workshops.
- Demonstrate the appropriate techniques used for joining products made from wood, metal, bricks or blocks, plastics and paper.
- Display sketches for appraisal.
- Display specimens and artefacts for appraisal.
- Demonstrate how to care for and maintain tools and equipment used for joining and assembling at building sites, wood, metal and plastic workshops.

Duration

Teachers can teach this topic in eight periods.

3. Resources

- Learner's Book
- Charts with information about joining and assembling materials, tools and equipment
- Charts that show artefacts that have been joined and assembled
- Joining and assembling materials, tools and equipment
- A4 sheets of paper, flip charts and pieces of cardboard
- Specimen workpieces or artefacts and materials
- Personal protection equipment (PPE)
- Videos that show how to use joining and assembling materials

4. Using ICT

Teachers can use laptops, projectors, pen drives, PowerPoint presentations, and MS WordPads to sketch joining and assembling tools and equipment as well as cutting or shaping tools and equipment when teaching this topic. Teachers should prepare videos for all the practical lessons.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Read and research information about joining and assembling materials, tools and equipment.
- Research and practise using materials, tools and equipment for joining and assembling sewing products.
- Do research about how to join and assemble workpieces.
- Collect and prepare teaching and learning resources such as pictures that are relevant to lessons, for example, the teacher should prepare a chart with information about joining and assembling materials.
- Prepare teaching and learning resources (charts, Power Point presentations, artefacts or workpieces and materials, and videos).
- Look for additional information on the internet.

5.2 Teaching strategies

Brainstorming, discussions (group and whole class), group work, pair work and demonstrations

5.3 Relevant background knowledge

Learners have been introduced to joining and assembling tools, equipment and materials and they know some of the processes we use for joining and assembling. Learners have seen carpenters make tables, chairs, and desks by joining and assembling pieces using nails, glues, screws and rivets. Learners have seen dressmakers use joining and assembling tools in sewing workshops. Learners use some joining and assembling materials at home and sometimes at school.

6. Suggested homework

1. Give two reasons why we use different patterns to bond bricks or blocks.
2. Which type of fastener can you use to fix a number plate to a car?
3. What is the difference between mortar and concrete?
4. Describe how workers make cement.
5. Make a freehand sketch of each tool and label its parts. If possible, use an MS WordPad to complete your drawings.
 - a) wooden mallet
 - b) claw hammer
 - c) G-clamp

- d) electric soldering iron bit
 - e) trowel
 - f) screwdriver
 - g) rubber or plastic mallet
6. Use joining and assembling tools and equipment to produce a sewing article that will be useful in the home.

7. Assessment

7.1 Assessment questions

1. Name three most important joining and assembling tools workers use when bonding a wall.
2. Explain the term, *bonding a wall*.
3. List three types of bonds
4. a) Give one use for a trowel.
b) What is the best way to care for and maintain a trowel?
5. Why do we place waste wood between a G-clamp and a workpiece when we clamp the workpiece?
6. Which two tools can we use to join and assemble articles in a sewing centre?
7. Give two uses for glue in a sewing centre.
8. Name the tool with which you can work faster than by hand when stitching.
9. Identify and list joining and assembling materials that are used in a food laboratory.

Answers

1. Joining and assembling tools (any three): trowel, spirit level, gauge rod, wooden float, straight edge
2. Bonding a wall means arranging the bricks or blocks in a pattern that avoids vertical, continuous joints.
3. Stretcher bond, header bond and Flemish bond
4. a) We use a trowel to pick up and spread mortar when bonding. We can also use a trowel to smooth and scrape off the excess mortar or concrete.
b) Trowels should be washed, cleaned and oiled after use.
5. The waste wood will protect the workpiece and prevent dents or damage to the workpiece.
6. Tools we use to join and assemble pieces in a sewing centre (any two): pins, sewing machine, sewing needle and thread, fabric glue
7. Uses for glue in a sewing centre (any two):
 - Add decorations, such as appliques to products.
 - Create neat, clean seams.
 - Keep fabric parts such as pockets in place temporarily before you sew them into place.
 - Repairs to a product when you have very little time.
8. Sewing machine
9. Oats, silicon, gelatin

7.2 Reflective practice or diagnostic assessment exercises

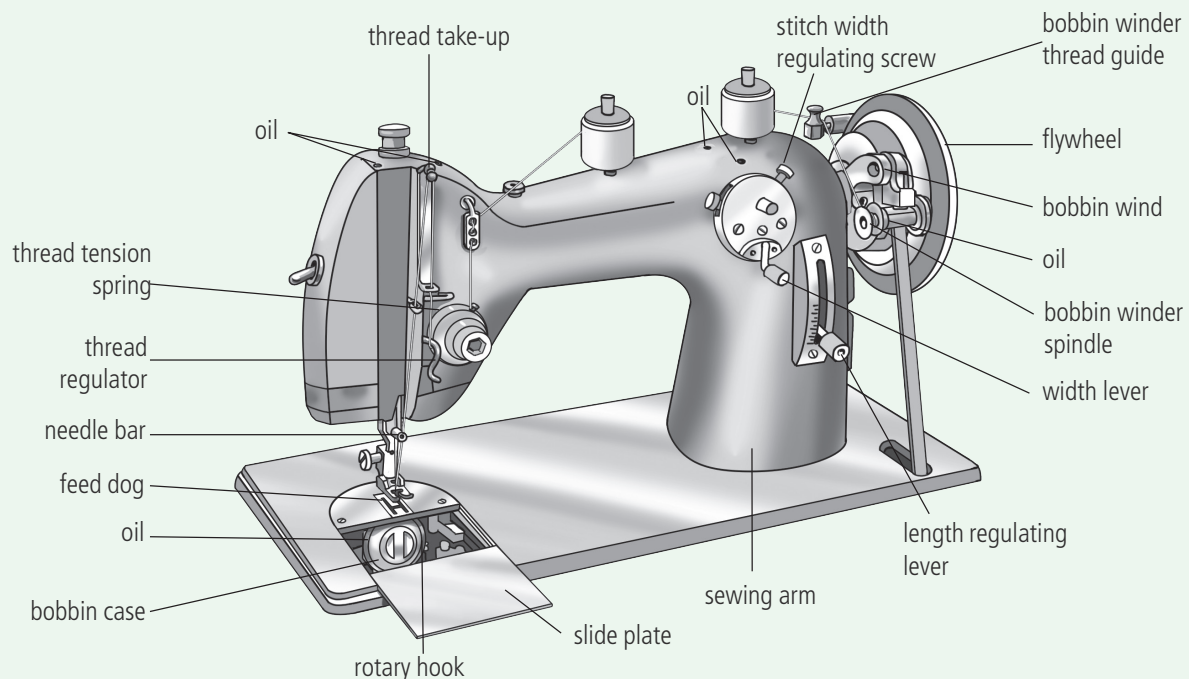
1. How well were learners able to identify joining and assembling materials, tools and equipment that are used for paper, woodwork, metal and plastic work?
2. How well do learners understand the term, *bonding*?
3. How many of the three bonds could learners name?
4. Were learners able to identify what we use trowels for and how to care for and maintain trowels?
5. How well do learners understand why we use waste wood when clamping a workpiece in a vice?
6. Could learners name two joining and assembling tools that are used in a sewing centre?
7. Could learners give two uses for glue in a sewing centre?
8. Do learners know which tool is used in a sewing centre?
9. How many joining and assembly materials that we use in a food laboratory could learners name?

8. Answers

ACTIVITY 3.36

LB page 103

1. a) Learners sketch a manual sewing machine and label it. Below is an example.



- b) Learners display their sketches.
2. a) We use fabric glue to add decorations, such as appliques and to create clean and neat seams.
- b) Oats contains starch that has a higher nutritional value than other starches.
- c) We use thread to form the stitches that hold fabric parts together.
3. Learners draw a dish that was made using gelatin.

ACTIVITY 3.37

LB page 104

Learners work on their own.

1. Learners make labelled sketches of tools that are used at building sites including measuring and marking or setting-out tools.
2. a) Cement: a material that is never used on its own; it is only used as a binder
- b) Concrete: material that is used to construct several different parts of buildings
- c) Mortar: a mixture that is only used to hold bricks together

ACTIVITY 3.38 **Practical: Practise controlling a sewing machine** LB page 108

Learners work on their own.

If possible, learners start with a manual sewing machine.

- 1,2.** Learners experiment with how fast or slow the machine will sew (without thread). They must try to get the machine to work at an even speed.
- 3.** Learners practise sewing with thread.

ACTIVITY 3.39 **Practical: Make stitches using a sewing machine** LB page 109

Learners work on their own.

Learners need practice sheets like the ones shown in the activity. They can print the sheets or prepare their own sheets.

Learners follow the instructions in the activity.

ACTIVITY 3.40 **Practical: practise crochet stitches** LB page 112

Learners work in groups.

Learners watch videos that show crocheting stitches. They complete stitches and show their work to the other group members. Where necessary, they redo stitches.

ACTIVITY 3.41 **Practical: Screw wooden boards together** LB page 113

Learners work in groups.

Teachers give each group all the materials, fasteners and tools they will need to screw the wooden boards together. If possible, teachers show learners a video demonstration. Learners follow the instructions and screw the wooden boards together.

ACTIVITY 3.42 **Practical: Drive a nail into wood** LB page 113

Learners work on their own.

If possible, teachers show learners a video that shows how to drive a nail into wood. Teachers give each learner nails and two long pieces of scrap wood, one thinner than the other and a hammer to share with other learners. Learners follow the instructions and drive a nail into wood.

ACTIVITY 3.43 **Practical: Glue wooden boards together** LB page 113

Learners work in groups.

Teachers show a video about gluing wooden boards to learners. Teachers give each group the materials they will need (PVA glue, brushes, a cloth, a scraping tool, a G-clamp and two wooden boards). Learners follow the instructions and glue wooden boards together.

ACTIVITY 3.44 Practical: Bolt metal, plastic or wood together

LB page 114

Learners work in groups.

Learners follow instructions and join bolts, nuts and small pieces of plastic, metal and wood (with holes drilled into them).

ACTIVITY 3.45 Practical: Solder metal together

LB page 114

Learners work in pairs.

Teachers give learners the materials and tools they will need (two pieces of scrap metal, a soldering bit, a soldering stove (iron) or an electric soldering bit, solder, soldering flux (if necessary) and a wet sponge). Teachers help learners follow the instructions to solder two pieces of metal together.

ACTIVITY 3.46 Practical: Bonding bricks or blocks

LB page 115

Learners work in groups.

Teacher provides each group with 30 bricks or blocks and helps learners work through the instructions to dry bond the bricks or blocks by following instructions.

Teachers discuss the differences between the two types of bonding with the class.

ACTIVITY 3.47 Practical: Join plastic using a screw

LB page 116

Learners work in groups.

Teachers show a video about inserting a screw in plastic to learners. Teachers provide groups with self-tapping screws, pliers, screwdrivers, a heat source and two small pieces of plastic with pilot holes already drilled into them. Learners follow the instructions to insert a screw into plastic.

ACTIVITY 3.48 Practical: Glue plastic together

LB page 116

Learners work in pairs.

Teachers show a video about gluing plastic together to learners. Teachers give learners all the materials they will need (epoxy glue (two components), sanding material, small brushes, masking tape or rubber bands and two plastic parts of an artefact). Learners follow the instructions and glue two plastic parts together.

ACTIVITY 3.49 Practical: Glue pieces of card together

LB page 116

Learners work on their own.

Teachers show a video about gluing pieces of card together to learners. Teachers give learners the materials they will need (craft or paper glue and two pieces of stiff card). Learners follow instructions and glue pieces of card together.

Learners work in pairs.

1. Learners select joining and assembling tools and demonstrate how to clean them.
 - a) Building site: wash, dry and oil all metal parts of tools
 - b) Wood workshop: clean tools with a rag or an old towel after using them and oil all the metal parts to prevent rust
 - c) Metal and plastic workshop: clean tools with a rag or an old towel after using them and oil all the metal parts to prevent rust
 - d) Food laboratory: clean and place tools in containers when they are not in use
 - e) Sewing workshop: clean a sewing machine by removing all fluff with the aid of a small brush and oil the machine and replace the needle regularly.
2. Learners discuss the care needed when handling and storing glue, needles and nails.
 - a) Keep containers for the glue in a cool, dry, well-ventilated area.
 - b) Keep needles dry (to prevent corrosion) and then place needles in containers.
 - c) Keep nails away from extreme heat, direct flame, acids and other incompatibles and store them in the closed container in which you bought them in a dry place.

Linking Topics 3.3. and 3.4: Joining and kitchen essentials

Questions

1. Why is it important to join and assemble different components securely when creating artefacts?
2. How might different joining and assembling techniques be used in the process of preparing a cake?
3. How does proper care and maintenance of joining materials (glue or stitching) contribute to overall kitchen hygiene?
4. How do the properties of joining materials in food labs (gelatin, oats) influence their effectiveness in joining food items?
5. How do joining techniques ensure the functionality and safety of kitchen tools with multiple parts (whisks, spatulas)?

Answers

1. Secure joining ensures the final product is strong, functional, and safe to use.
2. Ingredients like flour and eggs are joined through mixing, while cake layers might be joined with frosting or jams.
3. Proper care of joining materials prevents them from harbouring bacteria or becoming weak, which could contaminate food or cause utensils to break.

Teacher guidance for open-ended questions

- Question 4: Ask students to consider the texture and setting properties of joining materials. Encourage students to think about additional joining techniques in food preparation (e.g., skewers for kebabs).
- Question 5: Guide students to think about the stress placed on different parts of kitchen tools. Discuss the importance of using joining techniques appropriate for the intended use of the tool.

Topic 3.4 Kitchen essentials

Content standard

- B8.3.4.1: Demonstrate understanding of maintaining kitchen essentials.

Indicators

- B8.3.4.1.1: Demonstrate how to care for and maintain kitchen essentials.

Core competencies

- **Communication and collaboration (CC)**
 - CC8.2: Explain ideas in a clear order with relevant details.
- **Creativity and innovation (CI)**
 - CI5.2: Ability to merge simple/complex ideas to create novel situations or things.

1. Introduction

Kitchen essentials are very important in the food laboratory. In this topic, the focus is on maintaining and caring for these essentials according to the materials from which each one was made.

2. Learning expectations

Learners need to be able to:

- Discuss suitable materials for cleaning kitchen essentials according to the materials from which each one was made.
- Demonstrate how to care for and maintain basic kitchen essentials.

Duration

Teachers can teach this topic in eight periods.

3. Resources

- Learner's Book
- Poster paper
- Pictures of kitchen essentials
- Videos about how to care for kitchen essentials
- Pictures and videos about how to care for and maintain kitchen essentials based on the material from which each one was made

4. Using ICT

Teachers can use cell phones, laptops, projectors, audio portable speakers, flash drives and PowerPoint presentations when teaching this topic.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Do research about how to care for kitchen essentials.
- Collect and prepare teaching and learning resources such as pictures that are relevant to lessons, for example, prepare a chart to show how to care for kitchen essentials based on the materials of which they are made.

5.2 Teaching strategies

Role play, brainstorming, discussions (groups and whole class), group work, demonstration and pair work

5.3 Relevant background knowledge

Learners care for kitchen essentials at home and sometimes at school.

6. Suggested homework

Ask learners to visit five homes in their community and record the ways in which people use and care for kitchen essentials.

7. Assessment

7.1 Assessment questions

1. How will you care for and maintain kitchen tools and equipment that were made from materials such as wood, stainless steel, aluminium and Teflon?
2. How will you clean kitchen tools and equipment, and which cleaning methods and materials will you use to clean tools that were made from different materials?
3.
 - a) Why do we sterilise kitchen essentials?
 - b) List three kitchen essentials that are sterilised in a food laboratory.
4. Outline the procedures involved in sterilising kitchen essentials.

Answers

1. **Wood:** To prevent cracks, do not leave wood in water for long periods of time.
Oil utensils regularly with beeswax or mineral oil.
Aluminium: Do not use metal utensils to clean aluminium pots and pans as they can damage or scratch the inner surfaces.
Store aluminium cookware carefully. Avoid direct contact with metal or sharp objects. Aluminium is not resistant to heavy blows. Excessive weight may deform an item.
Stainless steel: To limit scratches, avoid using sharp utensils, abrasive cleaners and steel wool when cleaning or washing stainless steel kitchen tools and equipment.
Teflon: Do not use sharp utensils on Teflon surfaces. Rather use plastic or wood so that you will not scrape off the coated surface of a tool or a piece of equipment.
Do not use harsh corrosive cleaning products such as scour pads, bleach or acids. Use a soft sponge or washing pad with soap or detergent.
Start at a lower temperature when you cook with Teflon-coated kitchen tools and equipment.
2. **Wooden tools**
Cleaning materials: soap or detergent, salt, baking soda, vinegar, sandpaper
Cleaning methods:
 - Handwash utensils with soap and water.
 - Let utensils air-dry completely before you pack them away.**Aluminium tools and equipment**
Cleaning materials: soap or detergent, vinegar, ground sifted eggshells, baking soda
Cleaning methods:
 - Wash with warm water, mild soap and a soft sponge.
 - After washing, dry immediately with a dry cloth.

- If food residue is left in pots, boil a little water with vinegar in a pot for four to five minutes. Then wash and rinse the pot as usual.
- Use ground sifted eggshells and baking soda to loosen stubborn food particles.
- Let aluminium pans and pots cool before you wash them as sudden changes of temperature can deform the base of a pot or pan and prevent the pot or pan from working properly.

Stainless steel tools and equipment:

Cleaning materials: Soap or detergent, baking soda, lime, salt, Brasso, ground sifted eggshells

Cleaning methods:

- Use baking soda and water to clean stainless steel utensils and pans. Cover the inside bottom of a pan with baking soda and add a little water. Work the baking soda around to form a paste that covers the areas where there are stains or burns. Leave the pot or pan for a few minutes and then wipe it clean with a sponge or a brush and hot water. Repeat the process as necessary to remove stubborn food stains or residue. Dry the utensil with a cloth.
- Use lime and salt to remove burnt-on food stains. Cut lime(s) in half and squeeze the juice onto the pan. Sprinkle regular table salt into the pan. Wait 10 to 15 minutes to allow the lime juice and salt mixture to work into the pan. Sprinkle more salt into the pan. Work the mixture around firmly with a soft sponge or with a non-abrasive cleaning pad. When the food spots have been released from the surface, wash the pan in warm soapy water.

Plastic tools and equipment

Cleaning materials: soap or detergent, baking soda, lime juice, vinegar, bleach

Cleaning methods:

- Plastics are often used to make cutting boards and bowls. Cutting on plastics can leave grooves in the surface, where bacteria can hide.
 - Sterilise plastic cutting boards regularly.
3. **a)** We sterilise kitchen essentials to ensure that we handle food safely.
b) Examples of kitchen tools and equipment we need to sterilise: knives, pots and pans
 4. Procedures involved in sterilising kitchen essentials:
 - Fill a large pot or pan so that the water will cover the utensils you put in the water. Adding salt to the water helps to disinfect and slightly increase the boiling temperature of the water, which will destroy more bacteria. Place a lid on the pot and heat the water to a boil.
 - Clean utensils before you sterilise them. Carefully place the clean utensils in the boiling water, cover the pot and allow it to boil for five minutes. Be careful and do not to let the water boil off completely. Add more water if necessary.
 - Turn the heat off after five minutes and use hot pads to remove the lid. Be careful when steam escapes.
 - Allow the water to stop boiling and carefully use tongs to take the utensils out of the water or drain the water in a colander. Place the utensils in cold water. Place the utensils on a drying rack to air dry. If you need to use the utensils, dry each one with a paper towel or with a clean drying towel. Make sure you wash your hands before you touch the tools.

7.2 Reflective practice or diagnostic assessment exercises

1. How well did learners explain how to care for and maintain tools and equipment that are made using wood, stainless steel, aluminium and Teflon?
2. How well did learners explain how to clean the different kitchen essentials? Did they know which cleaning methods and materials to use for tools made from different materials?
3. **a)** How well did learners explain why we sterilise kitchen essentials?
b) Did learners list three kitchen essentials that are sterilised in the food laboratory?
4. How well did learners outline the procedures involved in sterilising kitchen tools and equipment?

8. Answers

ACTIVITY 3.51 Practical: Demonstrate cleaning kitchen essentials LB page 120

Learners work in groups of four.

Each learner is assigned one kitchen utensil. They then work with learners in other groups who have been assigned the same utensil. Learners prepare a demonstration and then return to their original groups and demonstrate how to clean one kitchen essential.

Linking Topics 3.4 and 3.5: Kitchen essentials and finishing touches

Questions

1. Why is it important to maintain and sterilise kitchen utensils?
2. Imagine you have baked a delicious cake. How might different finishing techniques be used to enhance its presentation?
3. We learned about different finishing techniques in sewing (binding, hemming). List similar finishing techniques used in food preparation.
4. How can finishes contribute to the overall quality of a food dish?
5. How can finishing techniques for food and utensils elevate the dining experience in a restaurant?

Answers

1. Maintaining and sterilising utensils prevents the spread of bacteria and ensures food safety.
2. Finishing techniques like frosting, icing, or sprinkles can be used to decorate the cake.
3. Similar finishing techniques in food include plating arrangements (arranging food on a plate) or garnishing (adding decorative elements).

Teacher guidance for open-ended questions

- Question 4: Ask students to consider how finishes can affect taste and texture. Encourage students to think about finishes that preserve food (e.g., oiling a cheese to prevent drying).
- Question 5: Guide students to consider the synergy between food presentation and utensil selection. Discuss how finishes can create a cohesive theme or atmosphere, for example, using colourful garnishes or plating techniques to match a restaurant's décor.

Topic 3.5 Finishes and finishing

Content standard

- B8.3.5.1: Demonstrate understanding of application of finishes.

Indicators

- B8.3.5.1.1: Demonstrate how to mix the various finishes.
- B8.3.5.1.2: Demonstrate skills of finishing edges of sewing articles and food products.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.
- **Creativity and innovation (CI)**
 - CI5.2: Ability to merge simple /complex ideas to create novel situations or things.
 - CI6.10: Reflect on work and explore thinking behind thoughts and processes.

1. Introduction

Finishing refers to treating the edges of articles. Learners need to understand how to finish the edges of articles neatly and securely.

We apply edge finishes when sewing to make garments or articles complete and attractive.

2. Learning expectations

Learners need to be able to:

- Identify tools that are used to mix finishes.
- Demonstrate the procedure for mixing lacquer.
- Review the lesson from Basic 7 about finishes and finishing.
- Discuss reasons why we finish the edges of articles when sewing.
- Demonstrate skills at applying edge finishing.
- Display a specimen for appraisal.

Duration

Teachers can teach this topic in eight periods.

3. Resources

- Learner's Book
- Charts that show edges that have been finished
- Flip charts and cardboard
- Specimen of finishes
- Fabric and material
- Videos that show procedures for applying finishes to articles

4. Using ICT

Teachers can use laptops, projectors, pen drives, the internet and PowerPoint presentations when teaching this topic.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Read and research information about finishes and finishing that are used for articles.
- Research and practise applying finishes and finishing to articles.
- Prepare teaching and learning resources (such as charts, PowerPoint presentations, specimens and videos).
- Look for additional information on the internet.

5.2 Teaching strategies

Discussion (group and whole class), group work, pair work

5.3 Relevant background knowledge

Learners wear shirts and blouses with finished edges.

6. Suggested homework

Cut three squares of fabric or material that are 15 cm by 15 cm and finish the edges using fringing, binding and hem stitches.

7. Assessment

7.1 Assessment questions

1. Give three reasons why we apply finishing to the edges of garments and articles.
2. Explain what edge finishes are in sewing?

Answers

1. We apply finishes to prevent material from fraying, to strengthen edges and to add decorations or a style feature to a garment or an article.
2. Edge finishes are treatments we use to make the raw edges of sewn articles secure and prevent them from fraying.

7.2 Reflective practice or diagnostic assessment exercises

1. How well are learners able to identify tools used for mixing finishes?
2. How well are learners able to demonstrate how to mix lacquer?
3. How well are learners able to review the lesson from Basic 7 about finishes and finishing?
4. How well are learners able to discuss the reasons why we apply finishing to the edges of sewn articles?
5. How well are learners able to apply edge finishes?
6. How well are learners able to display specimens for appraisal?

8. Answers

ACTIVITY 3.52 Practical: Mix acrylic paint with water

LB page 122

Learners work in groups.

Learner follow instructions and mix emulsion or acrylic paint with water.

Learners display their mixtures for appraisal.

ACTIVITY 3.53

LB page 123

Learners work in pairs.

- A** Add decoration or a style feature.
- B** Add decoration or a style feature and prevent the edge from prevent fraying.
- C** Prevent the edge from fraying, strengthen the edge and add decoration or a style feature.

ACTIVITY 3.54

LB page 126

Learners work in groups.

- 1.**
 - A** Parsley
 - B** Lettuce and carrots
 - C** Green pepper and tomatoes
 - D** Tomatoes
 - E** Cherries
 - F** Icing
- 2.**
 - a)** Garnishes improved the colour of the dishes because they made the dishes look bright and attractive.
 - b)** Each garnish will add additional flavours and textures to the food. For example, garnishes such as pieces of carrot and green peppers will be crunchy because the garnish has not been fully cooked.

ACTIVITY 3.55 **Practical: Garnish popular dishes**

LB page 126

Learners work in groups.

Learners discuss how to garnish boiled yam and rice.

Learners compare and appraise other groups' work.

REVISION ANSWERS

(Learner's Book page 127)

1. **C** We measure and mark out all materials once they have been cut. (1)
2. **B** Hold the stock part of the square tightly against the cut edges. (1)
3. **B** Measure and mark out the materials. (1)
4. **C** Cutting and shaping (1)
5. **a)** surveyor's tape **b)** scribe **c)** level **d)** chisel (4)
6. **a)** Waist: Hold the tape measure around the narrowest part of the upper body.
b) Hip: Place the tape around the waist. Then roll it down around the widest part of the lower body and measure the hip.
c) Bust or chest: Measure at the fullest part of the bust; measure the chest circumference. Do not allow the tape measure to fall at the back. (3)
7. **a)** portion control
b) brick hammer
c) banku
d) beating (4)
8. **a)** False. Measuring spoons can be used for dry and liquid ingredients.
b) True.
c) True.
d) False. Wooden tools can be maintained using beeswax or mineral oil.
e) False. Finishing can be applied to food served as both sweet and savoury garnishes. (5)
9. **a)** forging
b) moulding
c) clamping
d) crocheting (4)
10. We can use French curves to shape armholes, skirts and hems when sewing. (1)
11. **a)** Jack plane: You can use a jack plane to flatten and smooth rough pieces of wood.
b) Rubber mallet: You can use a rubber mallet to nudge ceramic tiles into position without damaging them.
c) Scissors: We use scissors to cut materials and trim edges when sewing. (3)
12. When cross-filing, move a file across the length of a piece of work.
When draw-filing, hold the blade at 90° to create a smoother finish after cross-filing. (4)
13. Place a steel ruler at 90° to something you want to measure. (1)
14. You can hand crank a sewing machine by turning the handle.
When using a treadle sewing machine, you work the foot pedal.
An electric sewing machine is powered by electricity. (6)
15. Nails and screws are common fasteners.
We use nails to join pieces of wood.
We use screws to join pieces of wood and other materials. (4)
16. Cement is a fine powder that is made by crushing large blocks of limestone.
Concrete is a building material that is a mixture of cement, sand, small stones and water. (2)
17. **a)** Apply contact adhesive to both surfaces you want to stick together. We use it with wood and cardboard.
b) Epoxy resin consists of a resin and a hardener that must be mixed. You can use it on metals, wood and smooth plastic surfaces.
c) We use PVA glue on wooden products that will be used indoors. It is not waterproof. (3)
18. To apply a double-fold binding finish, place bias binding along the raw edge, sew the seam, fold the bias binding over the seam, fold the raw edge under and sew along the free edge. (2)

Total: 50 marks

Module 4 Technology

This module has one topic.

Topic 4.1 Simple structures and mechanisms, electric and electronic systems

Content standard

- B8.4.1.1: Demonstrate understanding of application of principles of forces acting on structures.

Indicators

- B8.4.1.1.1: Perform experiments of principles of forces on structures.
- B8.4.1.1.2: Design and make simple school technology projects.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP5.1: Ability to combine information and ideas from several sources to reach a conclusion.
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.
- **Creativity and innovation (CI)**
 - CI 5.2: Ability to merge simple/complex ideas to create novel situations or things.
- **Communication and collaboration (CC)**
 - CC 8.2: Explain ideas in a clear order with relevant details.
 - CC 9.1: Demonstrate behaviour and skills of working towards group goals.

1. Introduction

This module focuses predominantly on technology. Learners will examine the forces that act on structures and they will learn about the types of forces present in everyday situations that act on structures. They need to understand the principles behind each type of force, how structures can be built to withstand these forces so that they will not collapse, and how these forces can be used to stabilise and strengthen structures. Examples include famous buildings.

There are several experiments and practical activities in this module that will help learners to experience and observe these forces at work. They will examine different materials used in structures and mechanisms, and note how they respond to and resist different forces.

Teachers will conclude this module by asking learners to design and make a simple school technology project, following the steps of the design process. It is important to emphasise these steps, which were first introduced in Basic 7 as they are also used this year and in Basic 9.

2. Learning expectations

Learners need to be able to:

- Research types of forces that can act on structural members in construction.
- Make sketches and notes about the types of forces that act on structural members.
- Identify suitable resistant materials that can be used to perform experiments:
 - Forces acting on structural members.

- Perform experiments to show how:
 - tension force can force a member to 'stretch'
 - compression force can cause a member to 'squash' or 'buckle'
 - shear force can cause a material to slide over another material
 - torsion force can cause a member to twist
 - a bending force, which acts at an angle to a member, tends to make it bend.
- Write their observations and take part in group and class discussions.
- Identify simple school technology projects.
- Explain reasons for choosing a project.
- Identify suitable materials, tools and equipment for making a project.
- Prepare a folio for a project.
- Follow the design process:
 - Plan and make a mock-up.
 - Test and evaluate the project pointing out the strengths and weaknesses.
 - Make modifications where needed.

Duration

This topic can be taught in six periods.

3. Resources

- Learner's Book
- Rectangular sponges (one for each pair of learners)
- Scissors
- Rope
- Tape or ribbon
- Spring scales
- Different materials with tensile strength, for example, fishing line, plastic bag, twine, knitting yarn, rubber band, thin chain, wire, plastic tube (or any other suitable materials)
- Different materials to test torsion force, for example, plastic bag, empty or half-full toothpaste tube, toilet paper holder, small towel, plastic ruler, ice-cream stick, empty toilet roll carton, metal fork, plastic fork, steel rod or thin bar, wooden sticks (or any other suitable materials)
- Plastic rulers that can bend or thin pieces of wood

4. Using ICT

To teach this topic, teachers can use a cell phone, laptop, projector, audio portable speaker, flash drive, presentations in MS PowerPoint, and MS WordPad to make any sketches.

The following activities require ICT:

- Activity 4.5 (page 134): Internet research about challenges faced in construction and how to overcome these challenges (suggested weblinks are given in the activity)
- Activity 4.8 (page 137): Internet research about twisted skyscrapers
- Activity 4.11 (page 140): Class project research, with illustrations

5. Teaching methodology

5.1 Preparation

The teacher should:

- Read and research information about different types of forces and how they act, and how these forces are used in construction.

- Prepare teaching and learning resources (pictures of structures that use forces to great effect and videos about how these forces are used, also videos about different forces).
- Sources materials listed in resources to test tensile and torsion forces.
- Visit the internet for further information.

5.2 Teaching strategies

Brainstorming, discussions, group work, demonstrations, whole class discussions, pair work

5.3 Relevant background knowledge

Learners have fair knowledge about structures from Basic 7, how they are used to carry loads, offer protection and maintain the shape of a structure. Learners should understand and remember the basic steps of the design process (see page 141 in the Learner's Book).

6. Suggested homework

1. Explain the terms, *procedure* and *artefact*.
2. Give reasons why we start working with information that is available when we work on a project.
3. Briefly describe the procedures for measuring and marking out artefacts in each area.
 - a) building sites
 - b) wood workshops
 - c) metal or plastic workshops
4. Search for information about measuring and marking out tools and equipment in each area.
 - a) building sites
 - b) wood workshops
 - c) metal or plastic workshops
5. Search for information about how to convert imperial measurement units into metric system units and metric units into imperial units.
6. Make a freehand sketch of each measuring and marking or setting out tool or piece of equipment. Label two parts on each tool.
 - a) surveyor's tape
 - b) builder's square with calibrations
 - c) spirit level
 - d) straight edge
 - e) steel ruler with calibrations
 - f) line and pins
 - g) tape measure
 - h) try square
 - i) marking gauge
 - j) callipers

Any of the practical activities can be given as homework. However, the project in Activity 4.11 will be done as homework according to the timeline the learners suggest.

7. Assessment

7.1 Assessment questions

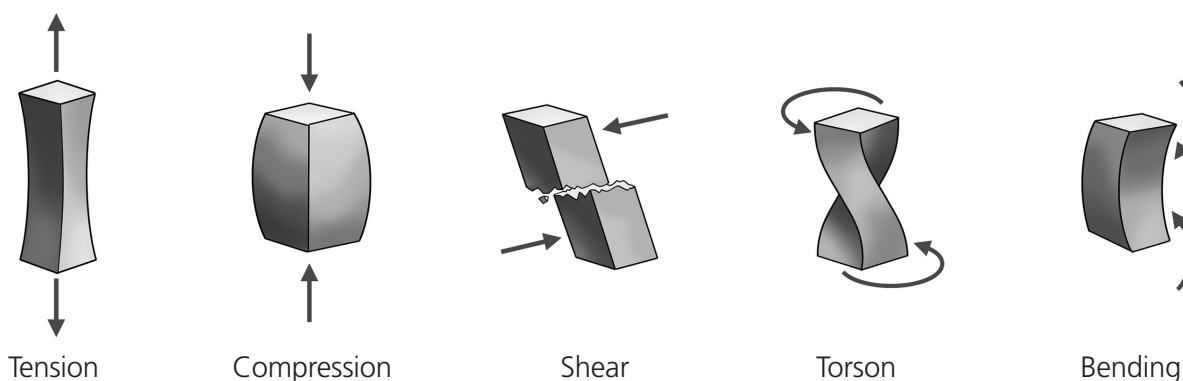
1. Name the five types of forces and draw a diagram that shows how each force acts.
2. Choose the force in the frame that matches each description.

bending	shear	torsion	compression	tension
---------	-------	---------	-------------	---------

- a) Pulling a rubber band
 - b) Pushing down on a metal spring
 - c) A bridge cracked by an earthquake
 - d) Rolling up a hose pipe
 - e) Squeezing water out of a sponge
3. List the five steps in the design process and give a brief description of each step.

Answers

1.



2.
 - a) Pulling a rubber band: tension
 - b) Pushing down on a metal spring: compression
 - c) A bridge cracked by an earthquake: shear
 - d) Rolling up a hose pipe: bending
 - e) Squeezing water out of a sponge: torsion

3. Five steps in the design process:

Step 1: Empathise

Put yourself in the position of the intended user of the product and work out what that person will need.

Step 2: Define the problem

Work out what the main goals of the project are, how you will know if your product is successful and what your project's unique value is.

Step 3: Ideate

Do research to help you find inspiration, brainstorm, think of three possible design ideas and list the resources you will need so that you can complete the project.

Step 4: Create a mock-up

A mock-up can be a drawing or a model of the project without the working parts.

Step 5: Evaluate and improve

Ask people to give you feedback on your plans. If necessary, improve your planning and the design process.

7.2 Reflective practice or diagnose assessment exercises

1. Can learners name the five types of forces?
2. Can learners identify the type of force in effect in real-life examples?
3. Can learners list and describe the five steps in the design process?

8. Answers

ACTIVITY 4.1

LB page 130

Learners work in groups.

Answers will differ based on the structure learners select.

ACTIVITY 4.2

Practical: Identify the difference between applied forces

LB page 131

Learners work in pairs.

1. Learners carry out simple experiments to help them identify forces.
2.
 - a) tension
 - b) compression
 - c) torsion
 - d) bending
 - e) shear

ACTIVITY 4.3

Practical: Demonstrate tension force

LB page 132

Learners work in groups of nine to play a game of tug of war. They let the rope hang slack and they should see that there is no force. Then the learners play the game and they should see that there is force. This demonstration explains tensile force.

ACTIVITY 4.4

Practical: Measure tensile strength

LB page 132

Learners work in groups.

If there are not enough spring scales, groups can share scales.

Learners compare their results in class. Teachers can write the answers on the board in order from the highest to the weakest tensile strength. Learners can copy the answers into their workbooks.

ACTIVITY 4.5

LB page 134

Learners work on their own.

Learners provide their own examples of construction strategies that builders can use based on their research and videos online.

ACTIVITY 4.6

LB page 135

Learners work in groups.

1. B will have the highest shear strength.
2. Learners give their own ideas based on the information on page 135 in the Learner's Book. Groups present their answers in class if time permits.

ACTIVITY 4.7**Practical: Demonstrate torsion force and torsional strength**

LB page 136

Learners work in groups.

Learners use at least 10 different objects to test or demonstrate the torsion forces in each object. They then record their findings and compare their results.

ACTIVITY 4.8**Project: Do research on twisted skyscrapers**

LB page 137

Learners work on their own.

Answers will depend on learners' research.

Use the rubric, *Writing a paragraph/report*, on page 99 in this book to assess learners' research.

ACTIVITY 4.9**Practical: Compare yield strength in rulers**

LB page 138

Learners work in groups.

Learners apply two types of forces to rulers and they record their results.

ACTIVITY 4.10**Practical: Demonstrate the principle of bending in a beam**

LB page 139

Learners work on their own to demonstrate the principle of bending a beam.

Learners make notes of what they observe.

ACTIVITY 4.11**Project: Design and make a class project**

LB page 140

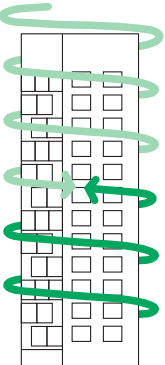
Learners work in pairs.

Allow enough time and make sure learners work within the time limit you have given them.

Use the rubric, *Project* on page 102 in this book to assess each pair's project.

REVISION ANSWERS

(Learner's Book page 142)

1. A beams, columns, roof trusses and suspension cables (1)
2. B that is pushed until it breaks (1)
3. B are the only causes of building failure (1)
4. A gravity (1)
5.
 - a) tension
 - b) shear
 - c) torsion
 - d) compression
 - e) bending (5)
6.
 - a) tension
 - b) compression
 - c) shear
 - d) bending
 - e) torsion (5)
7. Concrete is reinforced with steel bars. (2)
8. Tension force is achieved with wire or cable, and held in place by beams and ground anchors. (1)
9. Hollow columns and beams resist torsion better than solid columns and beams.
Structural members with closed cross-section shapes handle torsion force better than those with open cross-section shapes. (2)
10.
 - a) tension and compression
 - b) compression
 - c) compression
 - d) torsion (4)
11.  (2)

Total: 25 marks

This module has four topics.

Topic 5.1 Communicating designs

Content standard

- B8.5.1.1: Demonstrate understanding of drawing plane figures and solid objects using drawing instruments.

Indicators

- B8.5.1.1.1: Draw plane figures using instruments.
- B8.5.1.1.2: Draw objects in pictorial view using instruments.

Core competencies

- **Communication and collaboration (CC)**
 - CC8.2: Explain ideas in a clear order with relevant details.
- **Creativity and innovation (CI)**
 - CI5.2: Ability to merge simple or complex ideas to create novel situations or things.
 - CI6.3: Ability to select the most effective creative tools for work and give reasons for choice.
 - CI.10: Reflect on work and explore thinking behind thoughts and processes.

1. Introduction

Learners worked with drawings in Basic 7. In this topic, learners will use instruments to draw plane shapes such as circles, triangles, quadrilaterals and polygons, and they will draw objects in pictorial form or view.

2. Learning expectations

Learners need to be able to:

- Use instruments to draw plane figures (such as circles, triangles, quadrilaterals (including rectangles)).
- Use a set square to draw parallel lines.
- Use a compass to draw a regular heptagon.
- Use instruments to draw solid objects.
- Draw oblique, perspective and isometric pictorial drawings.
- Use instruments to draw a cube in oblique perspective.
- Use instruments to draw a box in two-point perspective.
- Use a set square to draw a box in isometric view.

Duration

Teachers can teach this topic in ten periods.

3. Resources

- Learner's Book
- Poster paper
- Drawing instruments (compass, ruler, set square, T-square)
- Videos that shown how to draw accurate plane figures and objects

4. Using ICT

Teachers can use cell phones, laptops, projectors and videos when teaching this topic.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Do research about drawing accurate plane figures and perspective drawings.
- Collect and prepare examples.
- Ensure that learners will have the instruments they need to draw accurate shapes.
- Find videos that show how to use a ruler, compass and protractor to construct triangles and other plane shapes.

5.2 Teaching strategies

Discussions (groups and whole class), group work, demonstrations, pair work

5.3 Relevant background knowledge

In Basic 7, learners worked with pencils, drawing paper, rulers, compasses, set squares, T-squares and drawing boards. They learnt to draw horizontal, vertical, inclined and curved lines and arcs. Learners drew parallel lines. They also learnt when to draw thick continuous lines, thin continuous lines, dashed lines and dimension lines. Learners also learnt to make oblique, isometric and perspective drawings.

6. Suggested homework

Teachers can ask learners to draw plane shapes such as squares, rectangles, parallelograms, rhombuses, trapeziums and kites. They should make sure that their drawing instruments are in a good condition.

7. Assessment

7.1 Assessment questions

1. Use a compass and a ruler to draw accurate plane shapes.
 - a) square with sides of 4 cm
 - b) rectangle with sides of 4 cm and 6 cm
 - c) circle with radius of 3 cm
 - d) equilateral triangle with sides of 3 cm
2. Identify each plane shape.
 - a) The shape has four sides. Opposite sides are parallel and equal in length.
 - b) The shape has three sides. The sides are all different lengths.
 - c) The shape has four sides that are all the same length. All angles are right angles.
 - d) The shape has four sides that are all the same length. Opposite angles are the same size. One pair of angles is larger than 90° and the other pair of angles is smaller than 90° .
 - e) The shape has three sides that are all the same length.
3. Use a set square to draw parallel lines with a perpendicular length of 4 cm between the lines.
4. Draw each cube on a grid.
 - a) Draw a cube in oblique view.
 - b) Draw a cube in isometric view.
 - c) Draw a cube in perspective view.

Answers

1. Learners draw accurate plane shapes.
2.
 - a) rectangle
 - b) scalene triangle
 - c) square
 - d) rhombus
 - e) equilateral triangle.

3. Draw one line. Use a set square to draw a thin line that is at right angles to the line. Measure off 4 cm on the line. Place the ruler on the thin line and the set square on the first line. Slide the set square along the ruler and draw a line when it is at the 4 cm line. Check if the space between the two parallel lines is 4 cm.
4.
 - a) Check if the shape at the front is a square and if the three side lengths are parallel.
 - b) Check if all the visible sides are the same length.
 - c) Check if the sides go back towards a vanishing point.

7.2 Reflective practice or diagnostic assessment exercises

1. How well did learners draw the four accurate plane shapes?
2. Which shapes did learners identify most easily?
3. How well did learners draw parallel lines that are 4 cm apart?
4. How well did learners draw the three cubes (oblique, isometric and perspective)?

8. Answers

ACTIVITY 5.1

LB page 146

Learners work on their own.

1. Learners construct accurate triangles. Teachers can ask learners to swap books and check the lengths of the sides in other learners' triangles.
2. Learners use a ruler, compass and protractor to construct two triangles.

ACTIVITY 5.2

LB page 147

Learners work on their own.

Properties	Parallelogram	Rectangle	Rhombus	Square	Kite	Trapezium
Only one pair of sides is parallel.						✓
Opposite sides are parallel.	✓	✓	✓	✓		
Opposite sides are equal.	✓	✓	✓	✓		
All sides are equal.			✓	✓		
Two pairs of adjacent sides are equal.			✓	✓	✓	
Opposite angles are equal.	✓	✓	✓	✓		
All angles are equal.		✓		✓		

ACTIVITY 5.3

Practical: Make and sort shapes

LB page 149

Learners work in groups.

1. Learners trace and cut out shapes. They sort shapes according to categories such as curves or lines, or the number of sides and angles. Learners display their work for appraisal.
2. Learners use the remaining cards to develop a card game.

ACTIVITY 5.4

LB page 151

Learners work in pairs.

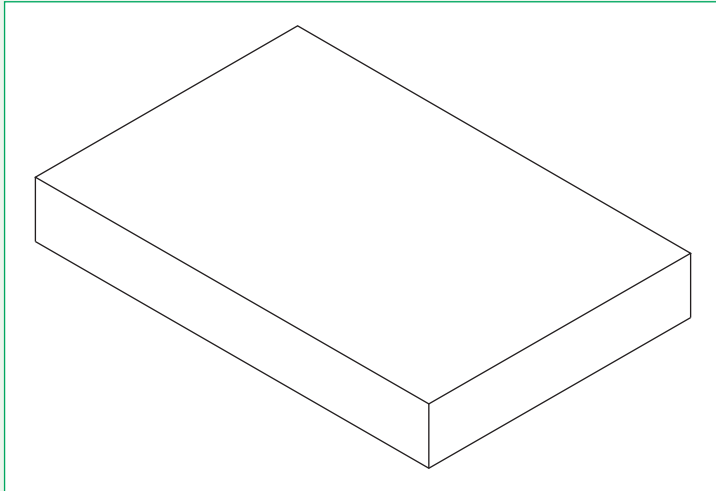
- | | | |
|---------------------------|--------------------|----------------------|
| 1. a) isometric | b) oblique | c) perspective |
| d) oblique | e) oblique | |
| 2. a) perspective drawing | b) oblique drawing | c) isometric drawing |

ACTIVITY 5.5 Practical: Make an isometric drawing

LB page 153

Learners work on their own.

Learners copy and complete the isometric drawing. Learners display their drawings for appraisal.



Linking Topics 5.1 and 5.2: Design communication and taking action

Questions

1. Why is it important to be able to draw different shapes and objects when designing?
2. How do different drawing techniques (oblique, isometric) communicate design ideas?
3. What information included in a design brief is crucial for creating an artefact?
4. Consider making an artefact using resistant materials. How can drawings and specifications from the design phase guide the creation process?
5. How do testing and evaluating help improve future designs?

Answers

1. It allows for clear communication of the design concept, size, and proportions.
2. It shows the design from multiple angles (oblique) or provides a 3D view (isometric) for better understanding.
3. It should detail the purpose, target user, materials, and specific functionalities of the artefact.

Teacher guidance for open-ended questions

- Question 4: Ask students to consider the specific features of the utensil in their design brief.
- Question 5: Encourage students to think about potential flaws or areas for improvement identified during testing. Discuss the importance of continual improvement in the design process.

Topic 5.2 Designing

Content standard

- B8.5.2.1: Demonstrate knowledge and skills of designing.

Indicators

- B8.5.2.1.1: Write a design brief.
- B8.5.2.1.2: Research into design problems.
- B8.5.2.1.3: Write design specifications.
- B8.5.2.1.4: Generate ideas or possible solutions.
- B8.5.2.1.5: Make artefact using resistant materials.
- B8.5.2.1.6: Test and evaluate made products/artefacts.
- B8.5.2.1.7: Demonstrate basic skills in cutting out designs without patterns in sewing.

Core competencies

- **Communication and collaboration (CC)**
 - CC8.2: Explain ideas in a clear order with relevant details.
- **Critical thinking and problem-solving (CP)**
 - CP5.1: Ability to combine information and ideas from several sources to reach a conclusion.
 - CP5.5: Effectively evaluate the success of solutions used in an attempt to solve a complex problem.
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.
- **Creativity and innovation (CI)**
 - CI5.2: Ability to merge simple or complex ideas to create novel situations or things.
 - CI6.3: Ability to select the most effective creative tools for work and give reasons for choice.
 - CI6.10: Reflect on work and explore thinking behind thoughts and processes.

1. Introduction

People design products that will help them solve problems. Teachers can discuss what society would have been like if, for example, the wheel was not invented hundreds of years ago, and what it would be like if we did not have cell phones.

In this topic, learners will learn about writing design briefs, researching design problems, writing design specifications, generating ideas and possible solutions, using resistant materials to make artefacts and testing and evaluating artefacts. They will also learn about basic skills we use when cutting out designs for which we do not have sewing patterns.

2. Learning expectations

Learners need to be able to:

- Identify and describe problem areas.
- Suggest suitable designs to solve problems.
- Develop an analysis chart that gives more information about the problem.
- Use questionnaires and interviews to conduct research into a problem.
- Develop observation schedules and make sketches or take photos.
- Analyse the data they collected and write a report for appraisal.
- Develop and write design specifications and motivate these specifications.
- Draw freehand sketches of possible solutions.

- Write notes for each idea they generate.
- Compare designs and select the best one.
- Develop the idea they select and make working drawings.
- Identify materials, tools and manufacturing processes that will be involved when making the product.
- Describe the procedure for measuring and marking out artefacts, articles and products.
- Organise the working environment to ensure health and safety when making a product.
- Make the product and then apply finish materials to the product.
- Test the product using the design specifications.
- Comment on the strengths and weaknesses of the design and make suggestions for modifying it.
- Rate the quality of the product as excellent, very good, good, fair or poor.
- Explain what is meant by freehand cutting when sewing.
- Cut out a shirt or a blouse on paper and display the parts of the garment.
- Discuss the importance of taking body measurements in sewing.
- Discuss the guidelines for taking body measurements.
- Take each other's body measurements for garment construction.

Duration

Teachers can teach this topic in four periods.

3. Resources

- Learner's Book
- Cardboard and lighter weight paper, drawing equipment, cutting tools
- Personal protection equipment (PPE)
- Pictures and videos that show how different products are made
- Charts with information about how to take body measurements
- Videos with the procedures to follow when taking body measurements

4. Using ICT

Teachers can use cell phones, laptops, projectors and videos when teaching this topic.

Teachers can use laptops, projectors, pen drives, the internet and PowerPoint presentations to show basic skills in cutting out designs without patterns and taking body measurements.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Read and research information about basic skills in cutting out designs without patterns.
- Prepare teaching and learning resources (charts, PowerPoint presentations, specimens and videos).
- Look for additional information on the internet.
- Do research about products that have been developed and that are used in their area to address problems.
- Collect and prepare teaching and learning resources.
- Find pictures, photos and videos that show how to make certain products.
- Research and practise how to take body measurements.

5.2 Teaching strategies

Brainstorming, discussions (groups and whole class), group work, pair work, working on their own, demonstrations

5.3 Relevant background knowledge

Learners use many products every day and they may know people who use products that most learners do not use (such as walking sticks and wheelchairs). Examples of products learners use daily include pencils, pens, books, cups, plates, knives, forks, school bags, bicycles and cell phones. Learners ride in cars and busses. Learners wear blouses and shirts that were made using pattern pieces and may have seen dressmakers taking body measurements.

6. Suggested homework

Learners list at least 10 products they use every day and order them with the ones that are most useful to them at the top of the list to the ones they do not really need at the bottom of the list.

7. Assessment

7.1 Assessment questions

1. Identify three products you use every day.
 - a) List the materials that were used to make each product.
 - b) List the tools that were used to make each product.
 - c) Do you think each product is effective? Give reasons for your answers.
 - d) Do you think the three products can be improved? If so, how?
2. Why do you have to think about the following factors when writing a design specification?
 - a) budget
 - b) functions
 - c) users
 - d) materials
3. Name five products that have been made using resistant materials.
4. What is the freehand cutting technique?
5. What are seams?
6. List four seams that are generally used in sewing.

Answers

1. Answers will depend on the products learners choose.
2.
 - a) If there is not enough money, you will not be able to make a product.
 - b) You need to know what the main uses will be for a product.
 - c) It must be clear who will use the product.
 - d) You need to know if the materials you will need are available.
3. Answers can differ. Examples include chairs, windows, forks, glasses, car bodies, plates, sewing machines and pencils.
4. When using the freehand cutting technique, we use a person's body measurements to plot and cut parts for garments or articles on fabrics when we do not have patterns.
5. We use seams to join two or more layers of fabrics.
6. Different types of seams (any four): French, plain/open/dressmaker's seam, run and fell, machine fell, overlaid

7.2 Reflective practice or diagnostic assessment exercises

1.
 - a,b) How well were learners able to identify the materials and tools that were used to make products?
 - c) How well were learners able to assess the effectiveness of products?
 - d) How good were learners' suggestions for improving products?

2. How well do learners understand why it is necessary to consider budgets, functions, users and materials when writing a design specification?
3. Were learners able to identify products that were made using resistant materials?
4. How well were learners able to explain the freehand cutting technique?
5. How well do learners understand the function of seams?
6. How many types of seams could learners list? (Learners will learn more about seams in the next topic.)

8. Answers

ACTIVITY 5.6

LB page 155

Learners work in the same groups for Activity 5.6 to Activity 5.10.

1. Learners interview community members about problem situations in their communities and they identify areas for improvement. Groups discuss the information they gathered.
2. Groups select one problem and write a short report.

ACTIVITY 5.7

LB page 155

Learners work in the same groups for Activity 5.6 to Activity 5.10.

1. Learners identify the main issues and challenges they identified.
2. They identify and discuss the problem that the solution needs to address.
3. Groups formulate a design brief that addresses the problem.

ACTIVITY 5.8

LB page 157

Learners work in the same groups for Activity 5.6 to Activity 5.10.

1. Learners prepare a questionnaire they can use when interviewing community members.
2. Learners organise observation visits.
3. Learners gather information about solutions.
4. They develop an analysis chart that includes their questions and findings.
5. Groups present their analysis charts or reports for appraisal.

ACTIVITY 5.9

LB page 158

Learners work in the same groups for Activity 5.6 to Activity 5.10.

1. Groups develop and write design specifications for a design solution.
2. Learners motivate the specifications they developed.

ACTIVITY 5.10

LB page 158

Learners work in the same groups for Activity 5.6 to Activity 5.10.

1. Learners draw freehand sketches of solutions they are suggesting.
2. Learners draw up three design plans with working notes. They can also make models of their designs.
3. Answers depend on groups' solutions.
4. Learners draw a working drawing that includes three views of their best idea.

ACTIVITY 5.11

LB page 160

Learners work in their own.

1. Answers depend on materials learners will use to make an artefact.
Example answer: scribe, pencil, tape measure, tenon saw, handsaw, smooth plane, welding machine, darkening helmet, hammer or mallet
2. Answers depend on the artefact learners will make.

ACTIVITY 5.12

LB page 160

Learners work on their own.

1. Order of design process steps:
Step 1: Write a **design brief** that takes all the aspects of the problem into account.
Step 2: Research the **design problem** so that you can check if the solution will be successful.
Step 3: Draw up an **analysis chart** to organise your findings in step 2.
Step 4: Write **design specifications** that include all aspects of the design (such as budget, function, users, materials, resources, success criteria, aesthetics, skills and safety).
Step 5: **Generate ideas** and investigate possible solutions to work out which solution will work best.
Step 6: **Make the artefact** according to the design you chose.
Step 7: **Test and evaluate** the artefact to see how well it works and, if possible and necessary, make improvements.
2. Learners write reports about their group's design process and they rate their own participation and understanding of different aspects of the project.

ACTIVITY 5.13 Practical: Take body measurements

LB page 161

Learners work in pairs of female or male learners for this activity and the next two activities.

Learners use tape measures to take each other's measurements and they record the measurements.

ACTIVITY 5.14**Practical: Use freehand cutting for a simple blouse**

LB page 162

Learners work in the same pairs as for Activity 5.13.

Learners will need paper, cheap fabric, tape measure, scissors, tailor's chalk, chalk or pencils. They follow the steps in the Learner's Book and cut out the front and back pieces of the blouse.

ACTIVITY 5.15**Practical: Use freehand cutting for a simple shirt**

LB page 163

Learners work in the same pairs as for the previous two activities.

Learners will need paper, cheap fabric, tape measure, scissors, tailor's chalk, chalk or pencils. They follow the steps in the Learner's Book and cut out the front and back pieces, sleeves and collar of a shirt.

Linking Topics 5.2 and 5.3: Design and planning for production**Questions**

1. Why is a design brief important before starting to plan the creation of an artefact?
2. How do drawings with different views help plan the construction of an artefact?
3. How can understanding seam types influence the planning stages of a garment (e.g., choosing fabrics)?
4. How can planning for health and safety in the design phase contribute to a successful and safe production process in a workshop?
5. How can understanding the arrangement and purpose of various table settings enhance the overall dining experience?

Answers

1. It provides clear direction, ensuring the final product meets its intended purpose.
2. Drawings with different views allow for precise planning of cuts and assembly of the artefact.
3. It helps in selecting appropriate fabrics based on their strength, weight, and how they react to different seams (e.g., delicate fabrics might not be suitable for bulky seams).

Teacher guidance for open-ended questions

- Question 4: Ask students to consider specific safety hazards associated with different workshop materials (e.g., sharp edges of wood, heat from metalworking). Encourage students to think about incorporating safety features into the design itself (e.g., rounded corners on a wooden phone stand).
- Question 5: Guide students to consider the functionality and aesthetics of table settings. Discuss the importance of planning a table setting to suit the occasion (e.g., formal dinner vs. casual breakfast).

Topic 5.3 Planning for making artefacts/products

Content standard

- B8.5.3.1: Demonstrate understanding of planning for making artefacts/products and table settings.

Indicators

- B8.5.3.1.1: Plan and make wooden, metal/plastics artefacts.
- B8.5.3.1.2: Plan and make building artefacts.
- B8.5.3.1.3: Planning to make sewing artefacts/products.
- B8.5.3.1.4: Planning to set a table.

Core competencies

- **Communication and collaboration (CC)**
 - CC8.2: Explain ideas in a clear order with relevant details.
- **Critical thinking and problem-solving (CP)**
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.
- **Creativity and innovation (CI)**
 - CI5.2: Ability to merge simple or complex ideas to create novel situations or things.
 - CI6.10: Reflect on work and explore thinking behind thoughts and processes.

1. Introduction

Planning is an important part of most activities

In this topic, the focus is on planning and making wooden, metal or plastic artefacts, building artefacts, sewing artefacts/products and planning to set a table.

In the first section in this topic, learners will learn to plan to make artefacts from wood, metal and plastics. The focus is also on health and safety conditions in a workshop and on preventing workshop hazards when they make building artefacts.

Learners will also learn to make sewing artefacts. They will learn about conspicuous and inconspicuous seams, and French, run and fell, and overlaid seams.

In the last section, the focus is on planning a table setting for a meal. In order to plan properly, we need to have a clear idea of the nature and appearance of the final product. Depending on what learners will produce, their planning tools can include recipes and menus. In this topic, learners will demonstrate what they understand about planning to set a table.

2. Learning expectations

Learners need to be able to:

- Have a clear idea about the final product they will make.
- Draw up a design folio that includes the elements they learnt about in the previous topic.
- Plan and make wooden, metal and plastic artefacts.
- Make working drawings and detailed drawings.
- Adhere to the health and safety conditions required for a workshop.
- Make a mock-up of a building project.
- Plan and make building artefacts.
- Plan to make sewing artefacts and products.
- Understand important seam terminology (including right and wrong sides, stitching or seam lines, seam allowance and seam finish).

- Understand different types of seams (including inconspicuous and conspicuous seams, and plain, French, run and fell, and overlaid seams).
- Discuss the different types of meals served in a day.
- Discuss the factors to consider when planning meals.
- Plan to set a table.

Duration

Teachers can teach this topic in four periods.

3. Resources

- Learner's Book
- Poster paper
- Personal protection equipment (PPE)
- Pictures of tableware
- Videos of table settings

4. Using ICT

Teachers can use cell phones, laptops, projectors, audio portable speakers, flash drives and PowerPoint presentations when teaching this topic.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Do research to find copies of working drawings and detailed drawings of artefacts.
- Try to arrange for learners to visit a workshop where furniture is made.
- Try to arrange for learners to visit a building site where workers mix and pour concrete.
- Find a video with information about health and safety measures for a workshop to show to learners.
- Find a video that shows how to make different seams when sewing.
- Prepare a chart with information about different sewing seams.
- Do research and find photos of different table settings.
- Collect and prepare teaching and learning resources such as pictures that are relevant to lessons, for example, prepare a chart with information about table setting.

5.2 Teaching strategies

Role play, brainstorming, discussion (groups and whole class), group work, pair work, work on their own, demonstrations

5.3 Relevant background knowledge

Learners set tables at home and sometimes at school when they eat.

6. Suggested homework

- a) Visit a workshop and observe how workers make a product such as a coffee table.
 - b) Write down at least three questions you would like to ask workers.
 - c) Take part in a class discussion of your questions and other learners' questions.
- a) Visit a building site where workers mix and cast concrete.
 - b) Write down at least three questions you would like to ask construction workers.
 - c) Take part in a class discussion of your questions and other learners' questions.

3. Visit a sewing workshop.
 - a) Make notes about the type of sewing machines workers use and the seams they use when making different garments and artefacts.
 - b) Write down at least three questions you would like to ask a worker in a sewing centre.
 - c) Take part in a class discussion of your questions and other learners' questions.
4. Visit five different homes and observe how people set tables at home.
 - a) Compile your observations and take part in a class discussion about table settings in homes.
 - b) How do you think table settings in homes differ from table settings in hotels?

7. Assessment

7.1 Assessment questions

1. Which statement is true?
 - A Working drawings and detailed drawing include dimensions.
 - B Working drawings show 3D-views of the product.
 - C Detailed drawings give the same amount of information as working drawings.
2. Which statement(s) are true?
 - A An exploded view is a detailed drawing.
 - B An exploded view shows all the parts of an artefact.
 - C You can use an exploded view to draw up a list of parts for an artefact.
3. What is a cutting list?
4. Which of the following items must be available in a workshop?
fire extinguishers, safety signs, emergency plans and exit routes, doctor, first aid box, nurse, someone who knows first aid
5. Give two examples of things that could pose a danger at a workplace.
6. Why should workers in a workshop remove their rings and jewellery and tie long hair back?
7. What is concrete?
8. Why is it important to think about how a garment will be used when you choose the fabric for it?
9. What is the difference between conspicuous and inconspicuous seams?
10. What is table setting?
11. a) What is tableware?
b) List examples of tableware.
12. What are the rules (or conventions) for arranging tableware?
13. Explain what a cover is.
14. a) Name the two types of table setting.
b) What is the difference between the two types of table setting?
c) Give examples of formal and informal table settings.
15. Give five reasons why table settings are important.
16. Is the statement true or false? If false, correct it.
The social setting of a meal and the amount of food that will be served determines the difference between formal and informal table settings.

Answers

1. B Working drawings show 3D-views of the product.
2. All three statements are true.
3. A cutting list includes all the parts and materials you will need to make a product.
4. fire extinguishers, safety signs, emergency plans and exit routes, first aid box, someone who knows first aid

5. Answers will differ. Below are examples.
Flammable substances that are not labelled and stored safely
Poor ventilation
Equipment that is placed in walkways and not packed away
Rotten timber
Planks with nails
6. If long hair and jewellery become stuck in a machine, a worker can be injured.
7. Concrete is a mixture of sand, crushed stone, water and cement.
8. You need to know how strong fabric must be. For example, clothes for a construction worker need to be stronger than school shirts.
9. You can see conspicuous seams on a garment, but you cannot see inconspicuous seams.
10. A table setting is an arrangement of tableware in preparation for a meal that will be served.
11. a) Tableware refers to the equipment people use when they eat a meal at a table.
b) Examples of tableware include: cutlery, glasses, plates, tablecloths, napkins and table decorations.
12. Rules for arranging tableware include:
- Place forks on the left of dinner plates. The exception is the dessert fork, which can be placed above the plate.
 - Place knives on the right of dinner plates. The cutting blade must face the plate. Place the butter knife, which is an exception, on the butter plate.
 - Place a glass or glasses slightly above the plate between the plate and the utensils (about where one o'clock is on a clock face)
 - Place utensils in the order in which they will be used with the utensils that will be used first on the outside. For example, place the salad fork on the outermost edge on the left to the left of the dinner fork because salads are usually served before main courses. Set only the utensils that will be needed for a meal. For example, if soup will not be served, do not set a soup spoon and a soup bowl.
13. A cover is the arrangement of a place setting for one person. It refers to the space in front of each diner at a table. A cover includes all the tableware one person will need for a meal. A cover can be large or small, depending on the meal and the social situation.
14. a) Formal and informal (or basic) table settings
b) Informal or basic table settings generally use fewer utensils and dishes while formal table setting need many more utensils and dishes.
c) Formal table settings are used for grand dinners, such as smart weddings and state functions. The meals at these events usually include several courses and so a large number of tableware items are set, as well as a card with the name of the guest.
Informal or casual settings are used for restaurant meals with two or three courses, or for small dinner parties at home or for meals at home or simple restaurant meals.
15. Reasons why table settings are important:
- Table settings save time when the food is being served.
 - A table setting makes guests feel respected and welcome.
 - A table setting influences the appearance of the food that is served. It stimulates the appetite and adds to the enjoyment of a meal.
 - A table cover shows a diner what to expect of a meal.
 - Table settings bring order to a meal and help all family members respect the occasion and each other.
16. True.

7.2 Reflective practice or diagnostic assessment exercises

1. About how many learners were able to pick the statement that is true?
2. About how many learners know that all three statements are true?
3. How well did learners explain what a cutting list is?
4. Did learners know that doctors and nurses are generally not available in workshops?
5. Could learners give two examples of things that could pose a danger at a workplace.
6. Do learners know why workers in a workshop should remove their rings and jewellery and tie long hair back?
7. Do learners know that concrete is a mixture of sand, crushed stone, water and cement?
8. How well do learners understand why strong fabrics are needed for certain garments, but not for others?
9. How well do learners understand the difference between conspicuous and inconspicuous seams?
10. How well did learners explain table setting?
11. How well did learners explain what tableware is and give examples?
12. How well do learners understand the rules for arranging tableware?
13. Do learners know the term, *cover*?
14. How well do learners understand the difference between formal and informal table settings?
15. Could learners give five reasons why table settings are important?
16. Do learners know that one way to distinguish between formal and informal table settings is to look at the social setting of a meal and the amount of food that will be served?

8. Answers

ACTIVITY 5.16

LB page 167

Learners work on their own.

Learners draw up a cutting list for the table shown on the working drawings.

ACTIVITY 5.17

LB page 168

Learners work in groups.

1.
 - a) Wet floor; you could slip and fall if you are not careful.
 - b) Flammable substances; a fire could break out and you could be injured.
 - c) Electrical current, high voltage electricity; there is a danger of being given an electrical shock.
 - d) No smoking; something flammable may be in the area.
2. Answers will depend on the workshop at school.
3. Groups discuss the reason for each rule in the workshop at school.
They also discuss rules that could be added to the existing rules.

ACTIVITY 5.18

LB page 168

Learners work on their own.

1. Learners select a piece of equipment that is used at school that could injure someone if it is not used correctly.
Learners plan how to create a safety tutorial for the tool.
2. Learners create a tutorial that can be displayed in class.

ACTIVITY 5.19

LB page 169

Learners work in groups.

1. Group members take turns to explain one safety practice.
2. Learners role play a situation where poor habits can result in an injury.
3. **a)** Learners discuss how wearing PPE can protect people.
b) Learners identify examples of PPE that are available in areas where they make artefacts.

ACTIVITY 5.20

LB page 173

Learners work in groups.

1. Learners discuss and describe the properties of cement, concrete, sand, clay bricks and stone.
2. Learners discuss reasons for choosing materials for building projects in your area.
3. Learners prepare a chart with the properties of building materials.

ACTIVITY 5.21**Practical: Make a mock-up of a simple building project**

LB page 173

Learners work on their own.

Learners make a mock-up of a simple building project. When choosing the material that will be used for different parts of the structure, they consider strength, cost and durability. Learners display their mock-ups in class for appraisal.

ACTIVITY 5.22

LB page 177

Learners work in groups.

A shows an overlaid (or lapped) seam. This type of seam is not bulky. We use it to join edges that are irregularly shaped. It is often used when sewing bulky material. We can use an overlaid seam to attach a yoke to a bodice and a bodice to a skirt at the waistline.

B shows a machine fell seam. This type of seam is often used on thick and heavy material such as denim. The two stitch lines are visible on the right side of the fabric. (A machine fell seam is called a run and fell seam when it is sewn by hand.)

C shows a French seam. French seams are strong and suitable for products such as gloves.

ACTIVITY 5.23

LB page 177

Learners work on their own.

1. Open seams have the seam allowances, which we press open with a hot iron after we have sewn the seam. Closed seams have the seam allowances that are pressed to one side.
2. Inconspicuous seams do not have visual stitching or reinforcing on the face side of the garment. Conspicuous seams are visible on the right side of a garment.
3. Machine fell or run and fell seams are the strongest seams.
4. Examples (any two): French seams, machine fell seams, run and fell seams

Learners work on their own.

1. Basic: dinner knife (3), dinner fork (2), plate (1), glass (5), napkin (4)
 Informal cover tableware: salad fork (6), dinner fork (2), soup spoon (8), salad knife (7), dinner knife (3), dinner plate (1), salad plate (10), soup bowl (9), two glasses (5), napkin (4)
 Formal: bread plate (14), butter spreader (15), salad fork (6), dinner fork (2), teaspoon (13), soup spoon (8), salad knife (7), dinner knife (3), dinner plate (1), soup bowl (9), salad plate (10), dessert spoon (12), desert fork (11), place card (16), three glasses (5), cup and saucer (17), napkin (4)
2. Learners do research on the internet about different types of table settings.
3. Learners do research to find videos of table settings.

Linking Topics 5.3 and 5.4: Planning and making artefacts

Questions

1. Why is creating detailed drawings and a cutting list important during the planning stage of making an artefact?
2. How is understanding health and safety precautions in the workshop helpful when using tools and materials to build a birdhouse from wood?
3. We learned about different types of seams and fullness techniques in sewing. How can planning these elements influence the final design and fit of a garment?
4. How is an understanding of the design of a table setting applied for a special occasion?
5. How does planning the construction steps ensure a successful and well-made final product?

Answers

1. Detailed drawings and a cutting list ensure accurate measurements, minimise material waste, and guide the construction process.
2. Understanding safety precautions helps prevent accidents when using tools and working with potentially hazardous materials like wood.

Teacher guidance for open-ended questions

- Question 3: Ask students to consider the specific functions of seams and fullness techniques. Encourage students to think about how fabric choice might influence their seam and fullness selections.
- Question 4: Let students consider the purpose and theme of the special occasion. Discuss the importance of creating a visually appealing and functional table setting for guests.
- Question 5: Ask students to consider the properties of different materials. Encourage them to think about the order of assembly steps (e.g., joining smaller components before attaching larger pieces).

Topic 5.4 Making artefacts from compliant, resistant materials and food ingredients

Content standard

- B8.5.4.1: Demonstrate understanding of designing artefacts/products, and models and table setting.

Indicators

- B8.5.4.1.1: Demonstrate skills in table setting.
- B8.5.4.1.2: Demonstrate skills in making sewing artefacts/products using seams and arrangement of fullness.
- B8.5.4.1.3: Make artefacts/products using wood, metals or plastics.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP5.5: Effectively evaluate the success of solutions used in an attempt to solve a complex problem.
- **Creativity and innovation (CI)**
 - CI5.2: Ability to merge simple or complex ideas to create novel situations or things.
 - CI6.10: Reflect on work and explore thinking behind thoughts and processes.

1. Introduction

In this topic, learners will set tables, arrange fullness in fabric and make an artefact from wood, metal or plastic.

2. Learning expectations

Learners need to be able to:

- Know how to set a table for different types of meals.
- Make open plain, French, overlaid and run and fell seams.
- Demonstrate skills in sewing a blouse or a shirt.
- Gather stitches by hand and using a sewing machine.
- Make wedge and double-pointed darts.
- Make an artefact from wood, metal or plastic.

Duration

Teachers can teach this topic in ten periods.

3. Resources

- Learner's Book
- Tableware for table settings
- Pictures of table settings
- Videos that show how to set different table settings
- Fabric, sewing machines and other sewing tools
- Videos that show how to sew different seams, darts and how to gather fabric
- Pictures of artefacts learners can make from wood, metal or plastic
- Materials learners will use to make artefacts from wood, metal or plastic

4. Using ICT

Teachers can use cell phones, laptops, projectors and videos when teaching this topic.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Find photos and videos that show different table settings.
- Collect and prepare tableware.
- Find photos, videos and garments that illustrate different seams, darts and gathered fabric.
- Collect and prepare sewing equipment.
- Find photos, videos and artefacts about artefacts made from wood, metal or plastic.
- Collect and prepare materials for making artefacts from wood, metal or plastic.

5.2 Teaching strategies

Demonstrations, brainstorming, discussions (groups and whole class), group work, pair work, work on their own

5.3 Relevant background knowledge

Learners learnt about table settings in the previous topic. Learners have seen table settings at home. Learners have worn garments that were made using the different stitches they will learn to make in this topic. Learners use artefacts that are made from wood, metal and plastic every day.

6. Suggested homework

1. Draw pictures of different table settings – both at home and in more formal settings such as at weddings.
2. Practise sewing different seams by hand using paper or fabric.
3. Find two garments and identify the stitches that were used to make each one.
4. Take photos or draw pictures of examples of different ways to arrange fullness in fabric.
5. Make a list of three artefacts you would like to make.
 - a) List the materials you would need to make each artefact.
 - b) Decide which artefact is the most practical one for you to make.

7. Assessment

7.1 Assessment questions

1. Which statements are true? Correct false statements.
 - A Place forks on the left of the plate and knives on the right of the plate.
 - B The cutting edge on knives must face the plate.
 - C Place the fork someone will use first to the left of other forks.
 - D Place a salad plate on top of a soup bowl.
2. Explain the difference between a dart and a pleat.
3. Give three questions you should ask when you organise a workshop.
4. Place the steps in the operation sequence in the correct order. Number the steps from step 1 to step 5:
 - Cut the work pieces to size.
 - Prepare the surfaces of the artefact and apply the appropriate finish.
 - Measure and mark out the work pieces.
 - Prepare the material for the work pieces.
 - Cut the joints and assemble the various parts to form the artefact.

Answers

1. A, B and C are true.
D is false. Place the soup bowl on top of the salad plate.
2. A dart is a pleated section with a seam that gives the dart shape.
A pleat is folded fabric that is stitched at the top or the bottom. It creates volume.
3. Example questions (any three):
 - Are the rules for the workshop clear and understood?
 - Is the ventilation in the workshop good enough?
 - Is the workshop floor clean?
 - Are the working surfaces clear and uncluttered?
 - Are the tools I will need in working order?
4. Step 1: Prepare the material for the work pieces.
Step 2: Measure and mark out the work pieces.
Step 3: Cut the work pieces to size.
Step 4: Cut the joints and assemble the various parts to form the artefact.
Step 5: Prepare the surfaces of the artefact and apply the appropriate finish.

7.2 Reflective practice or diagnostic assessment exercises

1. Were learners able to identify the correct statements and correct the false statement?
2. How well do learners understand the difference between a dart and a pleat?
3. How well were learners able to ask appropriate questions when organising a workshop?
4. How well were learners able to arrange the steps in the operation sequence in the correct order?

8. Answers

ACTIVITY 5.25 Practical: Set a table for one cover

LB page 180

Learners work in pairs and in groups.

1. Learners follow the steps on page 180 in the Learner's Book and set one basic cover.
2. Groups assess each pair's table setting.
3. Pairs use the feedback from group members to correct their settings.
4. Groups discuss which tableware to remove when salad will not be served and when soup will not be served.

ACTIVITY 5.26 Practical: Sew a blouse or shirt

LB page 182

Learners work on their own.

Learners to follow the steps given in the activity.

1. Learners take the measurements they need to make a blouse or shirt.
2. They cut out the fabric pieces for the blouse or shirt.
3. Learners sew the seams they need to assemble the pieces.
4. Learners display their blouses or shirts for appraisal.

ACTIVITY 5.27

LB page 185

Work in groups.

Learners discuss how to choose the most appropriate techniques for arranging fullness.

Learners consider the factors given in the activity: type of garment, purpose for which article will be used, position of fullness, type of fabric and the age of the person who will wear the garment.

ACTIVITY 5.28 Practical: Making gathering stitches

LB page 186

Learners work on their own.

- 1,2.** Learners sew specimens of gathering using hand stitches and using machine stitches.
- 3.** Learners label their work and present it for appraisal.
- 4.** They inspect other learner's work and give feedback.
- 5.** Learners use feedback to modify stitches where necessary.
- 6.** Learners make a simple garment that includes gathering.

ACTIVITY 5.29 Practical: Making darts

LB page 187

Learners work on their own.

- 1,2.** Learners make specimens of wedge darts and of double-pointed darts.
- 3.** Learners label their work and present it for appraisal.
- 4.** They inspect other learner's work and give feedback.
- 5.** Learners use feedback to modify darts where necessary.
- 6.** Learners make a simple garment that includes darts.

ACTIVITY 5.30 Practical: Making an artefact using wood, metal or plastic

LB page 188

Learners work on their own.

- 1.** Learners decide what they want to make and list the materials and tools they will need.
- 2.** Learners organise the workshop and check if they understand the rules, if ventilation is good, if the floor is clean, if working surfaces are clear and uncluttered and if they have the tools they will need to make their artefacts.
- 3.** Learners study the cutting list and the working drawings and make sure that they know how to make the artefact.
- 4.** Learners follow the operation sequence to make their artefacts.
- 5.** Learners test their artefacts.
- 6.** Learners evaluate their artefacts.
- 7.** If necessary, learners modify their artefacts.

1. B plane figure (1)
2. C shape made up of straight lines that meet at angles (1)
3. B Equilateral triangles have two sides that are the same length; the third side is longer or shorter. (1)
4. a) oblique
b) isometric
c) perspective (3)
5. a) function
b) users
c) materials
d) resources
e) skills
f) safety
g) aesthetics
h) budget
i) success criteria (9)
6. Freehand cutting is a technique of drawing and cutting out garments directly on fabric. The dimensions and style lines are drawn straight onto the fabric and cut out. (2)
7. Cement is a mixture of limestone, clay, shells and sand. It is an adhesive that is added when making concrete and mortar. Cement helps these mixtures become strong when they are used for building. (3)
8. Inconspicuous seams are not visible on the right side of a garment.
Conspicuous seams are visible on the right side of a garment. (4)
9. a) An open or plain seam is the simplest type of seam. It can be used on almost any item or garment. The seam allowance with raw edges is pressed open and neatened.
b) A closed seam is a plain seam where the seam allowance is neatened and pressed to one side.
c) An overlaid or lapped seam has an overlap where one piece of fabric is placed on top of another piece of fabric. (6)
10. a) True.
b) False. Only set tableware that is required for the meal that will be served.
c) False. The table setting for one diner is called a cover.
d) True. (4)
11. Methods for arranging fullness
Double-pointed dart: Mark the dart onto the wrong side, fold the fabric so that the right sides face. Pin and tack the dart. Remove pins. Stitch the dart. End off or knot the ends of thread. Remove the tacking. Press the dart to one side.
Gathering stitches with a sewing machine: Thread the machine and adjust the stitch length to the maximum. Sew two rows of straight machine stitches on the right side. Do not backstitch. Start on one end, holding both bobbin thread tails and slide the fabric towards the centre. Repeat for the other side until the fabric is gathered to match the length of the joining fabric. Distribute gathers evenly.
Pleats: Mark out pleats according to the pattern or style. Fold and pin on the right side of the fabric. Press the pleats firmly in place and baste across the top of the pleats where the pins are. (6)

Total: 40 marks

This module has two topics.

Topic 6.1 Career pathways and career opportunities

Content standard

- B8.6.1.1: Demonstrate knowledge of career opportunities in Career Technology.

Indicators

- B8.6.1.1.1: Explore the various career pathways and opportunities in Career Technology.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP5.1: Ability to combine information and ideas from several sources to reach a conclusion.
- **Communication and collaboration (CC)**
 - CC9.1: Demonstrate behaviour and skills of working towards group goals.
- **Personal development and leadership (PL)**
 - PL5.1: Understanding of oneself (strengths, weaknesses, goals and aspirations, reacting and adjusting to novel situations).

1. Introduction

This topic focuses on the different career options for learners and it will help them identify their skills and interests. Identifying their skills and interests will help them identify possible career paths.

2. Learning expectations

Learners need to be able to:

- Research in groups, the different career pathways and opportunities using different resources.
- Write a brief report and present it in class.
- Examine their interests, skills and values in the light of the career opportunities.
- Compare their most promising career options with their list of prioritised skills, interests and values.

Duration

Teachers can teach this topic in four periods.

3. Resources

- Learner's Book
- Magazines and newspapers
- Access to the internet

4. Using ICT

Teachers can use a cell phone, laptop, projector, audio portable speakers, flash drive, and presentations in MS PowerPoint.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Do research and look for information about careers in the different technology fields
- Collect magazines and newspapers that learners can use in their research.
- Collect and prepare teaching and learning resources (information about careers in technology).

5.2 Teaching strategies

Brainstorming, class discussions, group work, writing skills, group discussions

5.3 Relevant background knowledge

Learners should know their strengths and weaknesses, and understand the biases and stereotypes that are still present in workplaces. They should be able to think freely and not be hindered by biases and stereotypes.

6. Suggested homework

Teachers can ask learners to complete Activity 6.3 for homework.

7. Assessment

7.1 Assessment questions

1. What do you need if you want a career in technology?
2. What is an apprenticeship?
3. List the three steps that can help you choose your career pathway.

Answers

1. Education and training
2. An apprenticeship gives the opportunity to learn a trade or skill from a qualified person for a fixed period of time, while you are doing some work for which you are paid.
3. Gather information about possible careers.
Find out more about your interests, skills and values.
Compare information about careers with your interests, skills and values, and find a match.

7.2 Reflective practice or diagnostic assessment exercises

1. Could learners identify what they need if they want to pursue a career in technology?
2. Could learners define an apprenticeship?
3. Did learners know the three steps that can help them choose a career pathway?

8. Answers

ACTIVITY 6.1

LB page 193

Learners work in groups.

1. Learners discuss the different jobs that are available in each career pathway. Teachers can encourage them to also look at specialised careers, such as owning a business.
2. Learners research the career pathways (online, in newspapers or magazines). Ask if parents are willing to discuss their jobs at a school visit. Teachers should try inviting a parent from each main trades.
3. Learners choose three careers. They write a report that answers the questions in the Learner's Book. Ensure each group member writes about at least one topic and that work is shared evenly.

Use the rubric, *Writing a paragraph/report* on page 99 of this book to assess learners' reports.

ACTIVITY 6.2

LB page 196

Learners work in pairs. The partners should know each other well. Learners complete the questionnaires on their own and then swap questionnaires and assess their partner's responses. They give each other feedback where necessary.

ACTIVITY 6.3

LB page 196

Learners work on their own. Learners prepare a class presentation about their chosen career path. They should include the three points on page 193 in the Learner's Book, along with other valid points. Teachers can give learners one week to prepare posters or PowerPoint presentations. Use the rubric on page 102 of this book to assess learners.

Linking Topics 6.1 and 6.2: Career paths and starting your own

Questions

1. Why is it important to explore different career pathways within Career Technology?
2. How might your knowledge of sewing and garment construction be helpful in a career path related to fashion?
3. How are the steps involved in setting up a micro or small business enterprise beneficial if you want to turn your creative skills into a source of income?
4. Think of examples within Career Technology where entrepreneurship might be a possibility.
5. Think about the benefits of working for an established company versus starting your own business. How can understanding both options help you plan for your future career?

Answers

1. Exploring different pathways allows you to identify areas that match your skills and interests within Career Technology.
2. It can be valuable in careers like fashion design, tailoring, or dressmaking.

Teacher guidance for open-ended questions

- Question 3: Ask students to consider the specific steps involved in setting up a business (e.g., identifying a product or service, creating a business plan, marketing). Encourage them to think about resources they might need to start a business (e.g., equipment, materials).
- Question 4: Guide students to consider specific career pathways within Career Technology. For example, in carpentry, someone could start a business making and selling furniture.
- Question 5: Ask students to compare the stability and income potential of established companies versus the risks and rewards of entrepreneurship. Discuss factors like personal preference for working independently or as part of a team, and the level of control one has over their career path in each scenario.

Topic 6.2 Establishing and managing a small business enterprise

Content standard

- B8.6.2.1: Demonstrate understanding of establishing and managing micro and small business enterprises.

Indicators

- B8.6.2.1.1: Explain what is meant by micro, small and medium-sized business enterprises.

Core competencies

- **Critical thinking and problem-solving (CP)**
 - CP6.5: Ability to select alternatives that adequately meet selected criteria.
- **Communication and collaboration (CC)**
 - CC8.2: Explain ideas in a clear order with relevant details.

1. Introduction

In this topic, learners will learn the differences between micro, small and medium-sized businesses and the steps to follow to set up a business. Learners will need to explore their own communities to identify examples of the different types of business and take photos that show these examples.

2. Learning expectations

Learners need to be able to:

- Discuss in groups what micro, small and medium-sized business enterprises mean.
- Identify businesses in their area that fit the criteria for micro, small and medium-sized business enterprises.
- Discuss the steps that are involved in setting up micro and small business enterprises.
- List four businesses in their area that fit the criteria for small and medium-sized business enterprises.
- Look at photos of different enterprises and classify each one as a micro, small or medium-sized business enterprise.
- Display their photo albums for discussion.

Duration

Teachers can teach this topic in four periods.

3. Resources

- Learner's Book
- Access to the internet
- Magazines and newspapers
- Cardboard to create photo albums

4. Using ICT

Teachers can use a cell phone, laptop, projector, audio portable speaker, flash drive, and presentations in MS PowerPoint.

5. Teaching methodology

5.1 Preparation

The teacher should:

- Do research to find information about different types of businesses in Ghana.
- Collect magazines and newspapers for collecting photos of different enterprises.
- Collect and prepare teaching and learning resources (information about different types of businesses).

5.2 Teaching strategies

Brainstorming, class discussions, group work, writing skills, group discussions

5.3 Relevant background knowledge

In Basic 7, learners learnt what an entrepreneur is and how to establish and run a small (micro) business.

6. Suggested homework

Both activities require learners to determine what types of businesses are in their communities.

7. Assessment

7.1 Assessment questions

- Name the three types of business enterprise that are covered in this topic.
 - Describe each type of business and give an example of such a business.
- List three steps to follow when you want to set up a micro or small enterprise.
- List four risks that are associated with setting up a small business.

Answers

- Micro, small and medium-sized businesses
 - The capital worth of a micro business is up to GH¢10,000. One to five people work in a micro business. An example is a business where the owner sells eggs.
The capital worth of a small business is up to GH¢100,000. Six to 29 people work in a small business. A pottery workshop with six potters is an example of a small business.
The capital worth of a medium-sized business is more than GH¢100,000. Such a business can employ 20 to 250 people. An example is a cashew-processing factory that employs 100 people.
- Three steps:
Step 1: Decide what you offer. What makes your business unique?
Step 2: Develop a business plan.
Step 3: Fulfil the legal obligations.
See the example box on page 198 in the Learner's Book for more information.
- Risks involved with starting a business:
 - You invest in equipment or goods. If the business fails, you will lose the money.
 - You may have to take out a loan. You will have to pay back the loan with interest.
 - You will not get a regular income at the end of each week or month.
 - You will need to work for long hours. This may result in your family being worried about you.

7.2 Reflective practice or diagnostic assessment exercises

- Can learners name and describe the three types of business enterprise and give an example of each one?
- Do learners know the three steps to follow to set up a micro or small enterprise?
- Do learners understand the risks that are associated with setting up a small business?

8. Answers

ACTIVITY 6.4

LB page 197

Learners work in groups.

- Learners discuss what micro, small and medium-sized businesses mean. They identify examples of such businesses in their communities. Learners take photos or find photos in magazines or newspapers that show each type of business.

2. Groups can use sheets of cardboard to make their photo albums. They should include two to three photos of each type of business and write a brief description of each business. Groups display their albums in the classroom.

Use the rubric, *Poster* on page 101 of this book to assess learners' photo albums.

ACTIVITY 6.5

LB page 198

Learners work in groups.

Learners choose one business from Activity 6.4 and discuss the steps an owner should follow to set up the business. They can use the steps on page 198 in the Learner's Book and add more. Each group should appoint a learner to present their steps to the class. Encourage all learners to take part in discussions.

REVISION ANSWERS

(Learner's Book page 199)

1. A TVET qualifications are provided by both government and private institutions. (1)
2. A lawyers and teachers (1)
3. C Getting information about careers helps the decision. (1)
4. a) Micro business: Capital worth of up to GH¢10,000, employs one to five people; for example, a cake decorator
 b) Small business: Capital worth of up to GH¢100,000, employs 6 to 29 people; for example, a small bakery
 c) Medium-sized business: Capital worth of more than GH¢100,000, employs 30 to 250 people; for example, a clothing factory (6)
5. a) Cake designers can run their businesses from home; so, they can be micro businesses.
 b) Chefs usually work at restaurants; so, they are not micro businesses.
 c) Mechanical engineers usually work for engineering firms; so, they are not micro businesses.
 d) Potters can run their own business from home; so, they can be micro businesses.
 e) Carpenter can work from own workshops and also from a furniture factory; so, they can be micro businesses, or they could work for a small business or a medium-sized business.
 f) Tailor can work from home and also at a clothing factory too; so, they can be micro businesses, or they could work for a small business or a medium-sized business.
 g) These operators usually work in factories; so, they are not micro businesses. (7)
6. a) A hand polisher needs to be patient as the job should be done slowly and properly to ensure that no spots are missed. It is not a job that can be rushed.
 b) A potter should be creative as he or she should create new designs.
 c) A tailor must be a good communicator and listener to produce what the client wants.
 d) An aircraft mechanic needs to be responsible. A mistake could cause a crash. (4)
7. Risks of starting up a micro or small business (one risk):
 - You invest in equipment or goods. If the business fails, you will lose the money.
 - You may have to take out a loan. You will have to pay back the loan with interest.
 - You will not get a regular income at the end of each week or month.
 - You will need to work for long hours. This may result in your family disputes. (2)
8. Steps involved in setting up a micro or small business:
 - Step 1: Decide what you offer. What makes your business unique?
 - Step 2: Develop a business plan.
 - Step 3: Fulfil the legal obligations. (3)

Total: 25 marks

Rubrics

Diagram: Proper waste disposal system

Ratings	3	2	1	0
Choice of waste disposal system	Learner chose a very good system to research.	Learner chose a good system to research.	Learner chose a system with some merit to research.	Learner chose a system that has no merit to research.
Information	Learner found excellent information about how the system works.	Learner found good information about how the system works.	Learner found some information about the system works.	Learner did not find information about how the system works.
Diagram	Diagram is neat and labelled correctly.	Diagram is quite neat. Some labels are missing.	Diagram is not very neat. Some labels are missing or incorrect.	Diagram is not clear and no labels were included.
Presentation	Excellent presentation of the diagram with detailed information. Learner answered questions well.	Good presentation of the diagram with some detailed information. Learner answered some questions well.	Parts of presentation were not good. Information is not detailed. Learner could not answer most questions.	Learner did not make a presentation or diagram is missing or incomplete. Learner did not answer any questions.

Total: 12

School recycling plan

Ratings	3	2	1	0
Merits of recycling plan	Group chose a good and very clear plan for recycling waste.	Group chose a good plan that is quite clear for recycling waste.	Group chose a plan to that has some merit. Not all aspects are clear.	Learner chose a plan to recycle waste that has no merit.
How easy will it be for learners to recycle waste?	This plan will make it very easy for learners to recycle waste.	This plan will make it quite easy for learners to recycle waste.	This plan will make it easy for some learners to recycle waste, but difficult for others.	This plan is not realistic. Learners will not be able to recycle waste.

Total: 6

Writing a paragraph/report

Ratings	3	2	1	0
Content	Covered all content well.	Covered some of content quite well.	Covered content poorly.	–
Understanding	Very good understanding of topic. Used own words.	Showed some understanding of topic. Did not use own words.	A lot of content was clearly take from sources. Did not use own words.	–
Length	Stuck to the prescribed length.	Writing is a little too long or too short.	Writing is too long or too short.	–
Grammar and spelling	Spelling and grammar correct.	Spelling and grammar mostly correct.	Quite a lot of spelling and grammar errors.	–

Total: 12

Project: Desertification and deforestation

Ratings	3	2	1	0
Completion	Learners did extensive research about desertification and deforestation.	Learners did good research about desertification and deforestation.	Learners did some research about desertification about deforestation.	Learners did not cover the topics well.
Steps in the research	Learners clearly understood instruction and time available.	Learners understood most steps in the research process clearly.	Learners did not understand most steps clearly.	Projects were incomplete or not handed in.
Appearance of project	Project is attractive with clear content and good illustrations or photos.	Content is mostly clear and one or two illustrations or photos were included.	Content is not very clear. Some illustrations or photos are not clear or are not relevant.	Content is confusing and/or no illustrations were included or project was not handed in.
Overall	The report is neat, spelling and grammar is correct. No correction markings were made.	The report is quite neat, some spelling and grammatical errors. One or two correction markings were made.	The report is not neat, several spelling and grammatical errors. More than two corrections.	The report is messy and difficult to understand, it contains many spelling and grammatical errors.
Group work	Groups worked well together and completed project on time.	Learners worked mostly on their own. They completed project on time.	Learners did not work together. They did not complete project on time.	Learners did not complete the project.

Total: 15

Chart: Three functions of food commodities

Ratings	3	2	1	0
Information on charts	Pairs found excellent information about the three functions of food commodities.	Pairs found good information about the three functions of food commodities.	Pairs found some appropriate information about the three functions of food commodities.	Pairs found no information about the 3 functions of food commodities or did not complete a chart.
Examples	Charts contain clear examples of the three functions of food commodities.	Charts contain many good examples of the three functions of food commodities.	Charts contain a few examples of the three functions of food commodities.	Charts contain fewer than 3 functions of food commodities or no chart completed.
Presentation	The presentation was clear. Learners answered questions very well.	Most of the presentation was clear. Learners answered questions well.	Parts of the presentation was clear. Learners answered a few questions well.	Presentation was unclear. Learners could not answer questions or did not give a presentation.
Involvement of both learners	Pair worked together preparing and presenting the chart. Answered questions.	One learner did most preparing and presenting, and answering questions.	One learner prepared the chart, presented the chart and answered questions.	Learners did not prepare a chart, make a presentation or answer questions.

Total: 12

Role play

Ratings	3	2	1	0
Speech	Clear speech; appropriate volume and emphasis.	Speech was sometimes indistinct or quiet.	Mostly quiet and indistinct speech; audience could not hear.	Topic and presentation do not relate to task.
Knowledge	Convincing role; showed knowledge of topic.	Role deviated sometimes, but generally stayed on topic.	Role was mostly irrelevant to the topic.	Presentation is incomplete.
Relevance	Comments, arguments and viewpoints were relevant to the topic.	Had a basic grasp of the topic, but a few facts were not accurate.	Knew only one or two facts and did not fully understand the topic at all.	No visuals are included or all visuals are not relevant.
Costumes/props	Used costumes and props appropriately.	Included 1 or 2 costumes or props.	Did not include any costumes or props.	Presenter did not speak.
Preparation	Role play was well prepared and organised.	Role play was quite well prepared	Role play was unrehearsed and not planned well.	Messy presentation; difficult to understand.

Total: 15

Poster

Ratings	3	2	1	0
Heading	Heading is clear.	Heading is not completely relevant.	Heading is not relevant.	No heading.
Content	At least five main ideas are conveyed clearly.	Three or four main ideas conveyed clearly.	One or two main ideas conveyed clearly.	Ideas not relevant or non-existent.
Illustrations or pictures	All pictures have captions and labels. Labels are neat and no lines overlap.	Most pictures have captions and labels. Some labels overlap.	A few pictures have captions and labels. Most labels overlap or are missing.	No pictures or pictures without no labels.
Creativity	Poster is well-designed. No visible pencil markings, colour is well used.	Two-toned poster with some pencil markings; limited colour use.	Poster is bland. No colour or design, but all elements are present.	Poster lacks imagination.
Neatness	Poster is neat, spelling and grammar correct. No corrections.	A few spelling and grammar errors. One or two correction markings.	Many spelling and grammar errors and correction markings. Or poster is untidy.	Poster is untidy and lacks cohesion.
Presentation	The presenter prepared well, spoke clearly and knows the topic.	The presenter knows the subject matter well and spoke quite well.	Presenter has limited knowledge; stumbled during presentation.	The learner did not present the information.
Timeliness	–	The poster was completed on time.	Poster submitted within 2 days of missing deadline.	No poster was submitted.

Total: 20

PowerPoint presentation/oral

Ratings	3	2	1	0
Topic	Topic researched and presented well.	Topic researched and presented quite well.	Topic not researched and presented well.	Topic presentation not related to task.
Presentation	Presentation complete; contains 5 or 6 relevant facts.	Presentation complete; includes less than 5 relevant facts.	Presentation complete; includes less than 3 relevant facts.	Presentation incomplete.
Use of visuals	Visuals relevant; captions correct.	Not all visuals relevant; not all captions correct.	1 or 2 visuals relevant; most captions not correct.	No visuals included or are not relevant.
Body language	Presenter was prepared; spoke clearly; knows	Presenter does not know all subject matter and did not always speak clearly.	Presenter had limited knowledge and stumbled through the presentation.	Presenter did not speak.
Neatness	Presentation neat; spelling and grammar correct; no corrections.	Presentation quite neat; some spelling and grammar errors; 1 or 2 corrections.	Presentation not neat; several spelling and grammar errors; several corrections.	Presentation messy and very difficult to understand.
Timeliness	Presentation ready on time; speaker prepared.	Presentation ready; speaker not prepared.	Presentation a day late; speaker not prepared.	No presentation received; no delivery.
Audience attention	–	Presentation held class's attention throughout.	Presentation held class's attention for some time.	No presentation to watch.

Total: 20

Project

Ratings	3	2	1	0
Design process	Process outlined; includes all steps; clear. At least 5 or 6 rough drawings + 1 or 2 final working drawings.	Process outlined; includes most steps. Descriptions adequate. At least 3 or 4 rough drawings + 1 final working drawing.	Process outlined; includes at least half of steps. Some descriptions missing. At least 1 or 2 rough drawings + 1 final working drawing.	Design process incomplete.
Sketches	All sketches captioned; labels correct.	Most sketches captioned; labels correct.	Few sketches captioned; labels incorrect.	No captions or
Timeline	Timeline complete; all materials and tools considered.	Timeline adequate; most materials and tools considered.	Timeline complete, some items not considered; materials excluded.	Timeline incomplete or missing.
Construction	Structure soundly made using correct materials; good use of colour.	Structure soundly made with weaknesses; limited use of colour.	Structure sloppy; does not work. Colour not used.	Structure incomplete or not made.
Report	Report complete with extra reasons to support choice of structure.	Includes all reasons to support choice of structure.	Includes some reasons to support choice of structure.	Report incomplete.
Overall	Design portfolio neat; spelling and grammar correct; no corrections.	Some spelling and grammar errors; 1 or 2 corrections.	Several spelling and grammar errors; correction markings; album untidy.	Portfolio messy and difficult to understand.
Pair work	Worked well together; completed project on time.	Worked on their own; completed project on time.	Struggled to work together; project not completed on time.	Project not completed.

Total: 35

Remedial activities

Topic 1.1: Personal hygiene and food hygiene

Questions

1. What is the main cause of bad body odour?
2. How can washing regularly help to avoid bad body odour?
3. What is the purpose of using deodorant roll-ons and sprays?
4. In what way does using lime or lemon help with body odour?
5. How does baking soda help to prevent bad body odour?

Answers

1. The main cause of bad body odour is bacteria on your skin breaking down sweat.
2. Washing regularly removes sweat and bacteria from your skin, reducing body odour.
3. Deodorant roll-ons and sprays help to mask the smell of body odour with a pleasant scent.
4. Lime or lemon juice can help to reduce body odour because they have acidic properties that can kill some odour-causing bacteria.
5. Baking soda can help to absorb sweat and neutralise odours caused by sweat.

Topic 1.2: Personal, workshop and food laboratory safety

Questions

1. Where should you find a first aid box in a workshop or food laboratory?
2. What is the first thing you should do for someone with a minor burn?
3. What two actions should you take to check if someone is unconscious?
4. What basic first aid treatment should be given to someone with a small cut?
5. In CPR, what body part do you push on with forceful compressions?

Answers

1. The first aid box should be kept in a clearly marked and easily accessible location.
2. The first thing you should do for someone with a minor burn is to cool the burned area under running water for at least 20 minutes.
3. Gently tap or shake their shoulders and ask loudly if they are alright.
4. The first aid treatment involves cleaning the wound with clean water and applying a sterile dressing.
5. In CPR, you should perform forceful compressions on the centre of the chest.

Topic 1.3: Environmental health

Questions

1. What is the term for the process where fertile land becomes desert?
2. What is the term for the permanent removal of trees from a land area?
3. How does uncontrolled dumping of waste harm the environment?
4. Which is NOT one of the "Four R's" of waste management: Burn, Reuse, Reduce, Recycle?
5. What is an example of waste that can be composted?

Answers

1. Desertification
2. Deforestation
3. Uncontrolled dumping can pollute water sources, soil, and air.
4. Burn (Composting is the correct answer)
5. Food scraps (vegetable peels, eggshells, etc.) are an example of waste that can be composted.

Topic 2.1: Compliant materials

Questions

1. Which of the following is NOT a type of compliant material?
a) Metal **b)** Paper
c) Cardboard **d)** Fabric
2. Compliant materials are often used for what reason?
a) Because they are very strong
b) Because they can be easily bent or folded
c) Because they are resistant to heat
d) Because they are very heavy
3. What everyday item is typically made from cardboard?
a) Cooking pot **b)** Shoe sole
c) Cereal box **d)** Knife handle
4. Is paper more or less compliant than fabric?
a) Paper is more compliant. **b)** Fabric is more compliant.
5. Describe one way that the compliant nature of fabric is useful.

Answers

1. **a)** Metal
2. **b)** Because they can be easily bent or folded
3. **c)** Cereal box
4. **a)** Paper is more compliant.
5. Fabric's compliant nature allows it to be draped, folded, and shaped into different forms, making it useful for clothing and other textile applications.

Topic 2.2: Resistant materials

Questions

1. What are two main categories of properties of resistant materials?
a) Shiny and dull **b)** Light and heavy
c) Physical and working **d)** Rough and smooth
2. Why are resistant materials important in construction?
a) Because they are easy to bend
b) Because they can be easily cut
c) Because they are strong and durable
d) Because they are brightly coloured
3. Which of the following is NOT a common building material?
a) Rubber **b)** Sand
c) Stone **d)** Cement

4. What property of cement is important for construction?
 - a) It is very light
 - b) It hardens when mixed with water
 - c) It bends easily
 - d) It breaks easily
5. Describe a simple test you could perform to see if a material is resistant.
 - a) Drop it and see if it makes a loud noise
 - b) Try to scratch it with your fingernail. If it scratches easily, it is not resistant.
 - c) Bend it. If it bends easily, it is not resistant.
 - d) Weigh it. Resistant materials are always heavy.

Answers

1. c) Physical and working
2. c) Because they are strong and durable
3. a) Rubber
4. b) It hardens when mixed with water
5. b) Try to scratch it with your fingernail. If it scratches easily, it is not resistant.

Topic 2.3: Smart and modern materials

Questions

1. What are materials with special properties that can respond to their environment in a specific way?
 - a) Resistant materials
 - b) Compliant materials
 - c) Everyday materials
 - d) Smart materials
2. In which industry can you find smart materials that keep food fresh for longer?
 - a) Textile industry
 - b) Electronics industry
 - c) Food industry
 - d) Building industry
3. Imagine a shirt that changes colour in hot weather. This is an example of a smart material being used in what industry?
 - a) Food industry
 - b) Textile industry
 - c) Healthcare industry
 - d) Building industry
4. Which of the following is NOT a benefit of using smart materials in the building industry?
 - a) Improved energy efficiency
 - b) Buildings that can repair themselves
 - c) Stronger and more durable structures
 - d) Food preparation in buildings
5. Give an example of a material traditionally used in healthcare that could be considered smart if it had a special property.

Answers

1. d) Smart materials
2. c) Food industry
3. b) Textile industry
4. d) Food preparation in buildings
5. A bandage that changes colour when a wound is infected could be an example of a smart material in healthcare.

Topic 2.4: Food commodities (animal and plant sources)

Questions

- What type of food helps your body grow and repair itself?
a) Energy-giving foods **b)** Body-building foods
c) Protective foods **d)** Flavouring foods
- Why are carbohydrates important in our diet? They are classified as:
a) Body-building foods **b)** Energy-giving foods
c) Protective foods **d)** Texturising foods
- List one example each of a body-building food, an energy-giving food, and a protective food commonly found in Ghana.
Body-building food: _____
Energy-giving food: _____
Protective food: _____
- What nutrients are found in abundance in protective foods?
a) Carbohydrates **b)** Proteins
c) Vitamins and minerals **d)** Fats
- Which food group is LEAST helpful if you are tired and need a quick energy boost?
a) Starchy vegetables (e.g., corn, plantains)
b) Lean meat or fish
c) Sugary snacks (e.g., candy)
d) Leafy green vegetables

Answers

- b)** Body-building foods
- b)** Energy-giving foods
- Body-building food: Beans (e.g., black beans, cowpeas) Energy-giving food: Maize (corn)
Protective food: Orange-fleshed sweet potato
- c)** Vitamins and minerals
- c)** Sugary snacks (e.g., candy)

Topic 3.1: Measuring and marking out

Questions

- Why is it important to measure and mark out materials before cutting or working with them?
a) To make the work look neater
b) To avoid wasting materials
c) To ensure the finished product fits together correctly
d) All of the above
- What tool is commonly used to measure long distances in a workshop or on a building site?
a) Ruler **b)** Tape measure
c) Marking gauge **d)** Calipers
- In the food laboratory, what tool might be used to measure small amounts of liquid ingredients?
a) Measuring cup **b)** Measuring jug
c) Tablespoon **d)** All of the above
- Why is it important to take accurate body measurements when sewing clothes?
a) To ensure the clothes fit the person comfortably **b)** To avoid using too much fabric
c) So the clothes look stylish **d)** Both a and b

5. How can inaccurate measuring tools lead to problems when making a model?
- a) The pieces may not fit together properly.
 - b) The model may be too large or too small.
 - c) The model may not look realistic.
 - d) All of the above

Answers

- 1. d) All of the above
- 2. b) Tape measure
- 3. d) All of the above
- 4. a) To ensure the clothes fit the person comfortably
- 5. d) All of the above

Topic 3.2: Cutting and shaping

Questions

- 1. What safety precautions should ALWAYS be taken when using cutting tools in a workshop?
 - a) Wear gloves
 - b) Wear eye protection
 - c) Point the sharp end towards yourself
 - d) Use the tool with one hand
- 2. What tool is commonly used to cut fabric with straight lines in the sewing workshop?
 - a) Pinking shears
 - b) Fabric scissors
 - c) French curves
 - d) Rotary cutter
- 3. Which of the following is NOT a technique used for shaping wood in a workshop?
 - a) Sanding
 - b) Sawing
 - c) Carving
 - d) Moulding
- 4. How can line bending be used to shape plastic in a plastics workshop?
 - a) By heating the plastic and gently bending it into shape
 - b) By cutting the plastic into a specific design
 - c) By using a mould to form the plastic
 - d) All of the above
- 5. What is the purpose of sharpening a cutting tool?
 - a) To make the tool more colourful
 - b) To remove rust from the tool
 - c) To make the tool cut more effectively
 - d) To make the tool easier to hold

Answers

- 1. b) Wear eye protection
- 2. b) Fabric scissors
- 3. d) Moulding (Moulding is typically used for shaping plastics or metals)
- 4. a) By heating the plastic and gently bending it into shape
- 5. c) To make the tool cut more effectively

Topic 3.3: Joining and assembling

Questions

1. Which of the following is NOT a material used for joining food items in a laboratory?
2. What type of glue is commonly used for adhering fabric together?
3. What is the first step you should take before sewing with a machine?
4. What is the name of a basic crochet stitch created by looping the yarn over the hook twice?
5. How are bricks and blocks typically joined together?

Answers

1. Oats (Oats are a food item, not a joining material)
2. Fabric glue
3. Threading the machine
4. Double crochet stitch
5. With mortar

Topic 3.4: Kitchen essentials

Questions

1. What is the main purpose of sterilising kitchen utensils?
2. Why is it important to sterilise utensils after using them with raw meat?
3. Which of the following methods is NOT typically used to sterilise kitchen utensils? a) Washing with hot soapy water b) Soaking in a bleach solution c) Leaving them to air dry d) Placing them in a dishwasher with a hot cycle
4. How long should utensils be boiled to sterilise them?
5. When using bleach to sterilise utensils, what is the safe ratio of bleach to water?

Answers

1. To kill bacteria and prevent foodborne illness.
2. Raw meat can contain harmful bacteria that can be transferred to other foods.
3. Leaving them to air dry (utensils should be dried completely after washing or sterilising).
4. At least 10 minutes.
5. 1 tablespoon of bleach per gallon of water.

Topic 3.5: Finishes and finishing

Questions

Match the finishing techniques in Column A to their descriptions in Column B:

Column A	Column B
1. Binding	a) Creates a decorative edge with raw fabric strands.
2. Hemming	b) Strengthens and prevents fraying on raw fabric edges.
3. Pinking	c) Encases a raw edge with folded fabric.
4. Fringing	d) Adds a decorative edging with a bias strip of fabric.

5. What is the main purpose of finishing food?

Answers

1. **d)** Creates a decorative edging with a bias strip of fabric.
2. **b)** Strengthens and prevents fraying on raw fabric edges.
3. **a)** Creates a decorative edge with raw fabric strands.
4. **c)** Encases a raw edge with folded fabric.
5. To enhance the appearance and presentation of food.

Topic 4.1: Simple structures and mechanisms, electric and electronic

Questions

1. What type of force acts when a rope is pulled tight?
2. What happens to a pillar in a building when it supports the weight of the roof?
3. Imagine you try to cut a piece of paper with scissors. Which force is acting on the paper?
4. How can a twisting force damage a structure?
5. What happens to a beam when you rest a heavy object on its middle?
6. List two forces that your simple school project might need to withstand.

Answers

1. Tension force
2. It experiences a compression force.
3. Shear force
4. Torsion force can cause the structure to twist and break.
5. The beam bends under the weight.
6. Answers will vary depending on the project, but could include: tension (for a hanging project), compression (for a supporting structure), and shear (for a project with cutting or sliding parts).

Topic 5.1: Communicating designs

Questions

1. How many sides does a triangle have?
2. What is the name for a four-sided flat shape?
3. What do we call a flat shape with many sides?
4. Match the pictorial drawing methods in Column A to their descriptions in Column B:

Column A	Column B
a) Isometric	i) Shows depth realistically, with objects appearing smaller as they recede.
b) Oblique	ii) Objects appear tilted, but remain parallel to the drawing plane.
c) Perspective	iii) All sides are shown in true proportion.

5. In isometric drawing, do the sides of the object appear slanted?

Answers

1. Three sides
2. Quadrilateral
3. Multi-sided polygon
4. a) **iii)** Shows depth realistically, with objects appearing smaller as they recede.
b) **ii)** Objects appear tilted, but remain parallel to the drawing plane.
c) **i)** All sides are shown in true proportion.
5. No, the sides of the object do not appear slanted in isometric drawing.

Topic 5.2: Designing

Questions

1. What is the main purpose of a design brief?
2. What should you do before starting to design a solution to a problem?
3. List two ways you can generate ideas for a new design.
4. What is the benefit of being able to cut out designs without using sewing patterns?
5. What tool is commonly used to cut out fabric shapes?

Answers

1. To clearly outline the requirements and goals of a design project.
2. Research the design problem to understand the needs and limitations.
3. Brainstorming and sketching different ideas are two ways to generate design ideas.
4. It allows for more creative freedom and customization in garment design.
5. Scissors are the most common tool used to cut out fabric shapes.

Topic 5.3: Planning for making artefacts/products

Questions

1. What is the main purpose of a working drawing?
2. What type of drawing shows all the parts of an object disassembled?
3. List one way to prevent hazards in a workshop environment.
4. What material is used to bind sand and stone together in concrete?
5. What is the difference between a conspicuous seam and an inconspicuous seam?
6. What is placed on the table as the first layer of a table setting?

Answers

1. To clearly communicate the design and dimensions of an artefact.
2. Exploded drawing
3. Keeping the workshop clean and organized (or other safety practices)
4. Cement
5. Inconspicuous seam: less noticeable on a garment; Conspicuous seam: more visible on a garment.
6. A cover (such as a tablecloth or placemat)

Topic 5.4: Making artefacts from compliant, resistant materials and food ingredients

Questions

1. What is the purpose of arranging a table setting?
2. List two examples of conspicuous seams used in sewing.
3. What is the difference between gathering and shirring?
4. Match the fullness techniques in Column A to their descriptions in Column B:

Column A	Column B
a) Darts	i) Creates a series of closely spaced gathers sewn together in rows.
b) Pleats	ii) Folds of fabric sewn in place to add fullness or shaping.
c) Ruffling	iii) Fabric is gathered tightly to create a full, soft effect.
d) Smocking	iv) Short folds sewn in place to create a fitted shape.
e) Ruching	v) Creates a rippled, decorative edge with loose gathers.

Answers

1. To create a visually appealing and organized dining experience.
2. Run and fell seam, Overlaid seam (or any other two correct answers).
3. Gathering uses looser, more spaced-out stitches to create fullness, while shirring uses tight rows of stitching to create a bloused effect.
4. **a) iv)** Creates a series of closely spaced gathers sewn together in rows.
b) ii) Folds of fabric sewn in place to add fullness or shaping.
c) v) Creates a rippled, decorative edge with loose gathers.
d) i) Creates a series of closely spaced gathers sewn together in rows.
e) iii) Fabric is gathered tightly to create a full, soft effect. (Smocking and shirring both use close gathers, but ruching creates a decorative edge.)

Topic 6.1: Career pathways and career opportunities

Questions

1. What is a career pathway in Career Technology?
2. List two examples of career pathways within Career Technology.
3. Match the following career titles to their descriptions:

Column A	Column B
a) Fashion Designer	i) Creates clothing and garment designs.
b) Carpenter	ii) Works with metal to join, cut, and shape structures.
c) Web Developer	iii) Creates and manages websites.
d) Welder	iv) Prepares and cooks food in a professional kitchen setting.
e) Chef	v) Builds and repairs structures using wood.

Answers

1. A career pathway is a sequence of education and training experiences that helps you prepare for a particular career in Career Technology.
2. Examples of career pathways (any two of the following):
 - Clothing and Textiles Technology
 - Metalwork Technology
 - Food and Nutrition
 - Woodwork Technology
 - Information Technology
3. a) i) Creates clothing and garment designs.
b) v) Builds and repairs structures using wood.
c) iii) Creates and manages websites.
d) ii) Works with metal to join, cut, and shape structures.
e) iv) Prepares and cooks food in a professional kitchen setting.

Topic 6.2: Establishing and managing a small business enterprise

Questions

1. Name a difference between a large company and a Micro, Small and Medium Enterprise (MSME).
2. Give an example of a small business you might see in your community.
3. List two steps involved in setting up a micro or small business enterprise.
4. What is the first step someone should take before starting a micro or small business?
5. Imagine you want to start a small bakery. What questions would you need to answer before starting your business? (Give two examples.)

Answers

1. Large companies typically have many employees and a lot of money, while MSMEs are smaller and have fewer resources.
2. Examples of small businesses (answers will vary depending on the learner's community):
 - Hairdresser/Barbershop
 - Food stall
 - Clothing store
 - Repair shop
3. Two steps involved in setting up a micro or small business enterprise:
 - Identifying a business idea
 - Writing a business plan
4. The first step is to identify a business idea and research the market.
5. Examples of questions to answer before starting a bakery:
 - What type of baked goods will I sell?
 - Who are my target customers?

ESSENTIAL

Career Technology

Basic 8

Facilitator's Guide

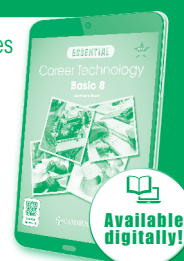
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