



KENYA INSTITUTE OF CURRICULUM DEVELOPMENT
A Skilled and Ethical Society

SENIOR SCHOOL CURRICULUM DESIGN

AVIATION

GRADE 11

OCTOBER, 2025

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NATIONAL GOALS OF EDUCATION

Education in Kenya should:

1. **Foster nationalism and patriotism and promote national unity.**
Kenya's people belong to different communities, races and religions, but these differences need not divide them. They must be able to live and interact as Kenyans. It is a paramount duty of education to help young people acquire this sense of nationhood by resolving conflicts and promoting positive attitudes of mutual respect which enable them to live together in harmony and foster patriotism in order to make a positive contribution to the life of the nation.
2. **Promote the social, economic, technological and industrial needs for national development.**
Education should prepare the youth of the country to play an effective and productive role in the life of the nation.
 - a) **Social Needs**
Education in Kenya must prepare children for changes in attitudes and relationships which are necessary for the smooth progress of a rapidly developing modern economy. There is bound to be a silent social revolution following in the wake of rapid modernization. Education should assist our youth to adapt to this change.
 - b) **Economic Needs**
Education in Kenya should produce citizens with the skills, knowledge, expertise and personal qualities that are required to support a growing economy. Kenya is building up a modern and independent economy which is in need of an adequate and relevant domestic workforce.
 - c) **Technological and Industrial Needs**
Education in Kenya should provide learners with the necessary skills and attitudes for industrial development. Kenya recognizes the rapid industrial and technological changes taking place, especially in the developed world. We can only be part of this development if our education system is deliberately focused on the knowledge, skills and attitudes that will prepare our young people for these changing global trends.
3. **Promote individual development and self-fulfilment**
Education should provide opportunities for the fullest development of individual talents and personality. It should help children to develop their potential interests and abilities. A vital aspect of individual development is the building of character.

4. **Promote sound moral and religious values.**
Education should provide for the development of knowledge, skills and attitudes that will enhance the acquisition of sound moral values and help children to grow up into self-disciplined, self-reliant and integrated citizens.
5. **Promote social equality and responsibility.**
Education should promote social equality and foster a sense of social responsibility within an education system which provides equal educational opportunities for all. It should give all children varied and challenging opportunities for collective activities and corporate social service irrespective of gender, ability or geographical environment.
6. **Promote respect for and development of Kenya's rich and varied cultures.**
Education should instil in the youth of Kenya an understanding of past and present cultures and their valid place in contemporary society. Children should be able to blend the best of traditional values with the changing requirements that must follow rapid development in order to build a stable and modern society.
7. **Promote international consciousness and foster positive attitudes towards other nations.**
Kenya is part of the international community. It is part of the complicated and interdependent network of peoples and nations. Education should therefore lead the youth of the country to accept membership of this international community with all the obligations and responsibilities, rights and benefits that this membership entails.
8. **Promote positive attitudes towards good health and environmental protection.**
Education should inculcate in young people the value of good health in order for them to avoid indulging in activities that will lead to physical or mental ill health. It should foster positive attitudes towards environmental development and conservation. It should lead the youth of Kenya to appreciate the need for a healthy environment.

THE SENIOR SCHOOL IN THE COMPETENCY BASED CURRICULUM

Senior School is the fourth level of Basic Education in the Competency Based Curriculum (CBC) that the learner shall proceed to after the Pre-Primary School, Primary School and Junior School levels. The essence of Senior School is to offer learners a pre-tertiary/university/ pre-career experience in which the learners have an opportunity to choose pathways, tracks and subjects where they shall have demonstrated interest and/or potential at the earlier levels. Senior School comprises three years of education for learners generally in the 16-18 years age bracket and lays the foundation for further education and training at the tertiary level and the world of work. In the CBC vision, learners exiting this level are expected to be *engaged, empowered and ethical citizens* ready to participate in the socio-economic development of the nation.

At this level, the learner shall take seven (7) learning areas as recommended by the *Presidential Working Party on Educational Reforms* (PWPER, 2023). These shall comprise **four compulsory learning areas** namely: English, Kiswahili, Essential Mathematics/Core Mathematics and Community Service Learning (CSL). Learners will choose between Core Mathematics (for learners pursuing the Science Technology Engineering and Mathematics Pathway) and Essential Mathematics (for learners pursuing the non-STEM pathways). The learner will select three learning areas depending on their career choice, aptitude, interest and personality with guidance by the Senior School career teacher.

LEARNING OUTCOMES FOR SENIOR SCHOOL

By the end of Senior School, the learner should be able to:

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

TABLE 1: LIST OF SUBJECTS AT SENIOR SCHOOL

Core Subjects	Arts & Sports Science	Social Sciences	Science, Technology, Engineering & Mathematics (STEM)
1. English 2. Kiswahili/KSL 3. Core Mathematics/ Essential Mathematics 4. Community Service Learning (CSL)	5. Sports and Recreation 6. Music and Dance 7. Theatre and Film 8. Fine Arts	9. Literature in English 10. Indigenous Languages 11. Fasihi ya Kiswahili 12. Sign Language 13. Arabic 14. French 15. German 16. Mandarin Chinese 17. Christian Religious Education 18. Islamic Religious Education 19. Hindu Religious Education 20. Business Studies 21. History and Citizenship 22. Geography	23. Biology 24. Chemistry 25. Physics 26. General Science 27. Agriculture 28. Computer Studies 29. Home Science 30. Aviation 31. Building Construction 32. Electricity 33. Metalwork 34. Power Mechanics 35. Woodwork 36. Media Technology 37. Marine and Fisheries Technology

Note:

- Physical Education (PE) and Information Communication and Technology (ICT) will be offered to all learners to facilitate learning, enjoyment and acquisition of life skills.
- Every school shall offer Pastoral/Religious Programme of Instruction (P/RPI) to enhance moral, spiritual and character development of the learners.
- There shall be one (1) lesson for personal or group study to deepen knowledge and enhance skills in areas of choice by the learners.

Table 2 provides guidelines on distribution of lessons at Senior School.

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TABLE 2: LESSON DISTRIBUTION AT SENIOR SCHOOL

Subjects	No of Lessons Per Week (40 minutes per lesson)
Core Subjects 4	
1. English	5
2. Kiswahili	5
3. Essential Mathematics/Core Mathematics	5
4. Community Service Learning	3
Elective Subjects	
5. Elective 1	5
6. Elective 2	5
7. Elective 3	5
* Physical Education	3
* ICT Skills	2
*PPI	1
* Learner Personal /Group Study	1
Total Number of Lessons	40

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ESSENCE STATEMENT

Aviation explores the dynamic world of flight and introduces the learner to the science and technology of aircraft and aerospace. It builds on the foundational concepts introduced in Pre-Technical Studies at Junior School and is aligned to the Technical Studies track of the Science Technology, Engineering and Mathematics (STEM) pathway.

The subject equips learners with the theoretical knowledge and practical skills in aviation safety, aircraft construction, flight and airport operations. Through practical hands-on experiences, project-based learning, simulations, engaging with real-world applications and emerging technologies, learners will develop competencies in designing, constructing and maintaining basic aircraft structures and systems, applying aviation safety standards, conducting flight and airport operations and appreciating aviation's impact on society and the environment.

Upon completion, learners will be prepared to transition into the world of work as apprentices or pursue further studies in aviation and related fields. The subject opens up to careers in fields such as aircraft maintenance, flight and airport operations, aviation safety and aviation entrepreneurship. Learners may also progress to technical and vocational education and training (TVET) institutions, aviation colleges, or university-level programs in piloting, aeronautical engineering, flight and airport operations or aviation management.

SUBJECT GENERAL LEARNING OUTCOMES

By the end of Senior School, the learner should be able to:

1. Demonstrate understanding of aviation theories, concepts, principles and operations.
2. Apply safety practices and procedures in aviation environments.
3. Evaluate weather, human and environmental factors in relation to flight operations.
4. Read, interpret, and use aircraft related drawings.
5. Apply financial and consumer literacy skills in aviation entrepreneurship.
6. Apply emerging technologies and environmentally sustainable practices in aviation.
7. Collaborate effectively with others when executing aviation tasks related to aviation.
8. Explore career opportunities in the aviation industry.

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SUMMARY OF STRANDS AND SUB STRANDS

Strands	Sub Strands
1.0 Foundations of Aviation	1.1 Airfield Safety
	1.2 Hangar Safety
2.0 Aircraft Basic Construction	2.1 Aircraft Structures
	2.2 Aircraft Propulsion
	2.3 Aircraft Related Drawing: Orthographic Projection
3.0 Flight Operations	3.1 Aircraft Flight Controls
	3.2 Flight Instruments
	3.3 Navigation
4.0 Airport Operations	4.1 Terminal Operations
	4.2 Ramp Services

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STRAND 1.0: FOUNDATIONS OF AVIATION

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Foundations of Aviation	1.1 Airfield Safety	By the end of the sub strand, the learner should be able to: a) explain the safety features in the operational areas of an airfield, b) describe the hazards related to airfield safety, c) simulate responses to hazards in an airfield, d) appreciate the importance of safety in the airfield.	The learner is guided to: - search on the internet for information on safety features in the operational areas of an airfield (<i>Runway - marking, numbering, lighting; Taxiway and Apron - marking, lighting</i>). - brainstorm on the hazards relate to airfield safety (<i>debris, wildlife, fuel spillage, adverse weather</i>). - use resource materials and discuss the different types of risks in the airfield (<i>foreign object damage, bird strike, aircraft collision, fire, slipping</i>). - use visual aids and video clips to demonstrate the responses to hazards in an airfield,	- Why is safety important in an airfield? - How can safety be promoted in an airfield?

			visit a local aerodrome to observe activities related to safety in an airfield.	
Core Competencies to be developed: - Communication and collaboration: the learner speaks clearly and effectively when brainstorming the hazards related to airfield safety. - Creativity and imagination: the learner exchanges new ideas when demonstrating the responses to hazards in an airfield. - Learning to learn: the learner shares what they have learnt when visiting a local aerodrome to observe activities related to safety in an airfield.				
Values: - Unity: the learner collaborates with peers when demonstrating the responses to hazards in an airfield. - Responsibility: the learner demonstrates care for digital devices when searching on the internet for information on safety features in the operational areas of an airfield.				
Pertinent and Contemporary Issues (PCIs): - Safety: the learner complies with instructions when visiting a local aerodrome to observe activities related to safety in an airfield. - Cyber security: the learner protects their personal information online when searching for information on safety features in the operational areas of an airfield.				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Foundations of Aviation	1.2 Hangar Safety	By the end of the sub strand, the learner should be able to: a) describe the layout of a hangar in aviation, b) explain the general rules related to safety in the hangar, c) examine the hazards related to hangar safety, d) simulate safe handling of equipment in the hangar, e) appreciate the importance of safety in the hangar.	The learner is guided to: - use the internet to search for information on the layout of a hangar in aviation, - use drawing equipment to illustrate the layout of a hangar in aviation, - use aviation literature to discuss the general rules relating to safety in the hangar (<i>personal, housekeeping, tools and equipment</i>), - role play with peers on the general safety rules related to the hangar, - use audio visual devices to watch video clips and discuss with peers on hazards related to hangar safety, (<i>fire, explosion, noise, electrocution, slips and falls</i>), - use realia to demonstrate the safe handling of hangar equipment in the airfield,	Why is safety important in the hangar?

			engage with a resource person on the importance of safety in the hangar.	
Core Competencies to be developed: - Learning to learn: the learner shares what they have learnt when demonstrating the safe handling of hangar equipment in the airfield. - Citizenship: the learner listens attentively and respond appropriately when engaging with a resource person on the importance of safety in the hangar. - Creativity and imagination: the learner generates new ideas when using drawing equipment to illustrate the layout of a hangar in aviation.				
Values - Love: the learner portrays a caring attitude for others when role playing with peers on the general safety rules related to the hangar. - Responsibility: the learner takes care of digital devices when using audio-visual aids to watch video clips on hazards related to hangar safety in aviation.				
Pertinent and Contemporary Issues (PCIs): - Cultural awareness: the learner appreciates diverse communities when engaging with a resource person on the importance of safety in the hangar. - Peer education: the learner shares what they have learnt with peers when role playing on the general safety rules related to the hangar.				

Suggested Assessment Rubric

Level Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Ability to explain safety features in the operational areas of an airfield	Comprehensively explains safety features in the operational areas of an airfield	Explains safety features in the operational areas of an airfield	Partially explains safety features in the operational areas of an airfield	Explain safety features in the operational areas of an airfield with assistance.
Ability to describe the hazards related to airfield safety	Comprehensively describes the hazards related to airfield safety	Describes the hazards related to airfield safety	Partially describes the hazards related to airfield safety	Describes the hazards related to airfield safety with assistance.
Ability to simulate safe handling of hangar equipment in the airfield	Consistently simulates safe handling of hangar equipment in the airfield	Simulates safe handling of hangar equipment in the airfield	Sometimes simulates safe handling of hangar equipment in the airfield	Simulates safe handling of hangar equipment in the airfield with assistance

STRAND 2.0: AIRCRAFT BASIC CONSTRUCTION

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Aircraft Basic Construction	2.1 Aircraft Structures	By the end of the sub strand, the learner should be able to: a) explain the types of loads acting on aircraft structures, b) describe the construction of aircraft structural members, c) classify hardware used in construction of aircraft structures, d) model structural members for aircraft construction, e) recognize the importance of structures in aircraft construction.	The learner is guided to: • use aviation books or online resources to search for information on the types of loads (<i>stresses</i>) acting on aircraft structures (<i>tension, compression, shear, bending, and torsion</i>), • use locally available materials to demonstrate the loads (<i>stresses</i>) acting on aircraft structures, • use cutaway diagrams or digital models to discuss on the construction of aircraft structural members (<i>Fuselage; truss, monocoque, semi monocoque, Wing; shapes, attachment positions, design – monospar, multispar and box beam, Landing gear; position, types, shock absorption</i>),	Why is an aircraft made of different structures?

			• use realia, aviation manuals or digital catalogues to group hardware in aircraft construction (<i>Fasteners; bolts, screws, nuts, washers, rivets, Control system; control cables, pulleys, fairleads, turnbuckles, push-pull rods, torque tubes, bellcranks and quadrants, Safety; cotter pins, safety wire, locking clips</i>), • use locally available materials, tools and hardware to construct aircraft structural members (<i>Fuselage; truss, monocoque, semi monocoque, Wing; monospar, multispar, box beam</i>), • visit a local aircraft maintenance organisation and observe the construction of aircraft structures.	
Core Competencies to be developed: • Creativity and imagination: The learner uses logical reasoning when using realia to group hardware in aircraft construction. • Self-efficacy: the learner confidently communicates with peers when discussing the construction of aircraft structural members.				

• Critical thinking and problem solving: the learner analyses the experiment when demonstrating the effects of stresses on aircraft structures.
Values: • Peace: the learner respects self and others when discussing the construction of aircraft structural members. • Respect: the learner accommodates diverse opinions when performing experiments to demonstrate the stresses acting on aircraft structures.
Pertinent and Contemporary Issues (PCIs): • Waste management: the learner safely disposes of used materials when using locally available materials to construct aircraft structural members • Cyber safety: the learner observes safety when using the internet to search for information on the stresses experienced on aircraft structures.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Aircraft Basic Construction	2.2 Aircraft Propulsion	By the end of the sub strand, the learner should be able to: a) explain the principles that govern aircraft propulsion, b) describe the types of engines in aircraft propulsion, c) classify the types of aircraft engines in propulsion, d) illustrate the construction of aircraft engines in propulsion, e) simulate the operation of aircraft engines in propulsion, f) recognise the importance of aircraft engines in propulsion.	The learner is guided to: - search on the internet for information on the principles that govern aircraft propulsion, (<i>Otto and Brayton cycles</i>), - use aviation books or online resources to search for information on the types of engines in aircraft propulsion, (<i>reciprocating and gas turbine engines</i>), - use aviation literature or audio-visual devices to discuss the construction of aircraft engines in propulsion (<i>four-stroke piston engine, turbojet, turbofan, turboprop and turboshaft engines</i>)	How is an aero-piston engine important?

			- use drawings instruments to sketch the construction of aircraft engines in propulsion (<i>four-stroke piston engine, turbojet, turbofan, turboprop and turboshaft engines</i>), - use flight simulation software or digital 3D cutaway engine models to simulate the operation of aircraft engines (<i>four-stroke piston engine, turbojet, turbofan, turboprop and turboshaft engines</i>), - use audio visual devices to watch video clips on the operation of different types of aircraft engines, - Visit an aviation training center or aircraft maintenance workshop to observe the operation of aircraft engines.	
Core Competencies to be developed: Creativity and imagination: the learner applies knowledge when using drawing equipment to sketch the components of aero piston engines in aircraft propulsion.				

• Self-efficacy: the learner communicates with confidence when discussing with peers the types of aero piston engines used in aircraft propulsion. • Digital literacy: the learner uses digital technology effectively when searching on the internet for information on the principle of aircraft propulsion.
Values: • Unity: the learner collaborates with peers when using audio visual devices to discuss and group types of aero piston engines used in aircraft propulsion. • Peace: the learner accommodates the opinion of others when using realia to demonstrate the operation of aero piston engines in aircraft propulsion.
Pertinent and Contemporary Issues (PCIs): • Civic responsibility: the learner observes rules and regulations when visiting an aviation training center or aircraft maintenance workshop to observe the operation of aircraft engines. • Peace Education: the learner relates well others when discussing the construction of aircraft engines in propulsion.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Aircraft Basic Construction	2.3 Aircraft Related Drawing: Orthographic Projection	By the end of the sub strand, the learner should be able to: a) explain the principles of orthographic projection in aircraft drawing, b) describe the methods of orthographic projection in drawing, c) draw orthographic projections of aircraft components, d) dimension orthographic projection drawings in aircraft construction, e) interpret aircraft component drawings in orthographic projection,	The learner is guided to: • use aviation books or online resources to search for information on the principles of orthographic projection (<i>projection of views, use of projection planes, alignment of views, scaling and proportion</i>), • use relevant aviation literature to discuss the methods of orthographic projection in drawing (<i>first and third angle projections</i>), • discuss the steps in drawing aircraft components in orthographic projection, • practice freehand sketching of aircraft components in orthographic projection (<i>first and third angle projections</i>),	How are orthographic projection drawings used in the aviation field?

		a) recognize the value of drawing interpretation in aircraft construction.	• use drawing instruments to create orthographic projection drawings of aircraft components (<i>wing, fuselage, fairing, fasteners, bracket</i>), • use scales and measurement tools to add dimensions to orthographic projection drawings, • use aircraft manuals or audio-visual devices to interpret aircraft component drawings in orthographic projection, • use audio visual devices to appreciate the value of drawing interpretation in aircraft construction.	
Core Competencies to be developed: • Communication and Collaboration: the learner sketches clearly when illustrating aircraft components in orthographic projection. • Digital literacy: the learner uses digital technology effectively when searching for information on views of orthographic drawings. • Critical thinking and Problem solving: the learner follows instruction when dimensioning aircraft drawings in orthographic projection.				

Values: • Responsibility: the learner cares for the print or digital media as well as drawing instruments when learning how to draw orthographic projection. • Unity: the learner cooperates with others when using digital devices to search for information and discussing steps followed while drawing aircraft components in orthographic projection.
Pertinent and Contemporary Issues (PCIs): Cyber safety: the learner practices responsible use of the internet when searching for information on views of orthographic drawings.

Suggested Assessment Rubric

Level Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Ability to explain stresses acting on aircraft structures in flight	Comprehensively explains stresses acting on aircraft structures in flight	Explains stresses acting on aircraft structures in flight	Partially explains stresses acting on aircraft structures in flight	Explains stresses acting on aircraft structures in flight with assistance
Ability to describe the structural members in aircraft construction	Comprehensively describe the structural members in aircraft construction	Describes the structural members in aircraft construction	Partially describes the structural members in aircraft construction	Describes the structural members in aircraft construction with assistance
Ability to simulate the operation of aero piston engine in aircraft propulsion	Consistently simulates the operation of aero piston engine in aircraft propulsion	Simulates the operation of aero piston engine in aircraft propulsion	Sometimes simulates the operation of aero piston engine in aircraft propulsion	Simulates the operation of aero piston engine in aircraft propulsion with assistance
Ability to dimension aircraft parts in orthographic projection	Consistently dimensions aircraft parts in orthographic projection	Dimensions aircraft parts in orthographic projection	Sometimes dimensions aircraft parts in orthographic projection	Dimensions aircraft parts in orthographic projection with prompts

STRAND 3.0: FLIGHT OPERATIONS

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Flight operations	3.1 Flight Controls	By the end of the sub strand, the learner should be able to: a) classify flight controls in the operation of an aircraft, b) describe the methods of operation of flight control systems, c) illustrate the construction of mechanical flight control system in flight operations, d) model a mechanical flight control system used in flight operations, e) simulate movement of mechanical flight control systems in flight operations, f) recognize the role of flight control systems in the operation of an aircraft.	The learner is guided to: - search on the internet for information on the classification of aircraft control in flight operations (<i>primary, secondary</i>), - use digital devices to search and watch video clips on the methods of operation of flight control systems (mechanical, hydraulic and fly-by-wire), - brainstorm on the components of mechanical aircraft control systems in flight operations (<i>from the cockpit to the control surfaces</i>), - use locally available materials to construct mechanical aircraft control systems in flight operations (<i>from the</i>	- Why are aircraft control systems important? - How can advancements in aircraft control systems enhance safety?

			<i>cockpit to control surfaces; ailerons, elevators, rudder, tabs, flaps),</i> • use the constructed models or flight simulation software to demonstrate the operation of the mechanical aircraft control systems in flight operations, • use audio visual devices to observe the effects of aircraft control systems in flight operations.	
Core Competencies to be developed: • Digital literacy: the learner interacts with technology using digital devices when using the internet to search for information on the construction of aircraft control systems in flight operations. • Self-efficacy: the learner shows concerted attention while using locally available materials to construct a model to demonstrate the operation of aircraft control systems in flight operations. • Creativity and imagination: the learner shows ability to use imagination to generate new ideas when using locally available materials to construct aircraft control systems in flight operations.				
Values: • Responsibility: the learner demonstrates care for digital devices when using audio visual devices to observe the effects of aircraft control systems in flight operations. • Unity: the learner works collaboratively with peers when using the constructed models to demonstrate the operation of aircraft control systems in flight operations.				

Pertinent and Contemporary Issues (PCIs): • Waste management: the learner disposes of used materials when using locally available materials to construct mechanical aircraft control systems in flight operations. • Nettiquette: the learner practises online ethics when searching the internet for information on the construction of aircraft control systems in flight operations.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Flight Operations	3.2 Flight Instruments	By the end of the sub strand, the learner should be able to: a) classify aircraft instruments in flight operations, b) describe the principles of operation of flight instrument, c) model flight instruments in flight operations, d) simulate the operation of aircraft instruments in flight operations, e) acknowledge the importance of instruments in flight operation.	The learner is guided to: - search on the internet for information on the classification of instruments in flight operations (<i>flight, navigation, engine, system</i>), - use audio visual devices to watch video clips and discuss the principles of operation of flight instruments (<i>pressure differential, gyroscopic action, magnetism</i>), - perform experiments to observe the principles of flight instruments, (<i>pressure differential, gyroscopic action, magnetism</i>), - use locally available materials to construct flight instruments (<i>pitot static, gyroscopic, magnetic</i>), - use the constructed instruments to demonstrate the operation in flight operations, - use a flight software to simulate the operation of flight instruments.	Why are flight instruments important in aircraft operations?

			engage with resource person on the importance of flight instruments in flight operations.	
Core Competencies to be developed: - Critical thinking and problem solving: the learner builds their understanding of complex problems when performing an experiment to observe the principles of flight using locally available materials. - Learning to learn: the learner organises their own learning when using locally available materials to perform experiments to observe the principles of flight instruments. - Communication and collaboration: the learner listens keenly and actively when discussing the principles of operation of flight instruments.				
Values: - Love: the learner avoids inflicting pain on others when using locally available materials to perform experiments to observe the principles of flight instruments. - Integrity: the learner utilises resources prudently when using locally available materials to construct flight instruments.				
Pertinent and Contemporary Issues (PCIs): - Netiquette: the learner practices online ethics when searching on the internet for information on the classification of instruments in flight operations. - Safety: the learner practises proper handling of tools when using locally available materials to construct the flight instruments.				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Flight Operations	3.3 Navigation	By the end of the sub strand, the learner should be able to: a) classify the type of airspace in flight operations, b) describe the classes of airspace in flight operations, c) illustrate the navigation methods in flight operations, d) design a route plan for an aircraft in flight operations, e) recognize the importance of navigation in flight operations.	The learner is guided to: • use aviation literature to search for information and discuss on the categories of airspace in flight operations (<i>controlled, uncontrolled</i>), • use the internet to search for information on the classes of airspace in flight operations, • discuss the characteristics of each class of airspace in flight operations (<i>altitude, purpose, location, users ATS</i>), • use digital devices to search and discuss the main types of navigation methods in flight operations (<i>pilotage, dead reckoning</i>), • use drawing equipment to construct a triangle of velocities to determine the route plan in flight operations (<i>heading, groundspeed, time, fuel required</i>),	What is the role of navigation in flight operations?

			• use audio visual devices to observe the navigation methods in flight operation.	
Core Competencies to be developed: • Communication and collaboration: the learner contributes to the group when using aviation literature to search for information and discuss the categories of airspace in flight operations. • Creativity and imagination: the learner undertakes tasks that show the ability to use imagination to generate new ideas when constructing a triangle of velocities to determine the route plan in flight operations. • Digital literacy: the learner interacts with technology when using digital devices to search for information on the main types of navigation methods in flight operations.				
Values: • Love: the learner respects others when discussing the characteristics of each class of airspace in flight operations. • Integrity: the learner demonstrates accountability when using audio visual devices to observe the navigation methods in flight operation.				
Pertinent and Contemporary Issues (PCIs): Cyber security: the learner observes online safety when using the internet to search for information on the methods of navigation in flight operations.				

Suggested Assessment Rubric

Level Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Ability to classify aircraft controls in flight operations	Comprehensively classifies aircraft controls in flight operations	Classifies aircraft controls in flight operations	Classifies aircraft controls in flight operations leaving out a few details.	Classifies aircraft controls in flight operations with assistance
Ability to describe the construction of aircraft control systems in flight operations	Comprehensively describes the construction of aircraft control systems in flight operations	Describe the construction of aircraft control in flight operations	Describes the construction of aircraft controls in flight operations leaving some parts	Describes the construction of aircraft controls in flight operations with assistance
Ability to demonstrate the operation of aircraft instruments in flight operations	Consistently demonstrates the operation of aircraft instruments in flight operations	Demonstrates the operation of aircraft instruments in flight operations	Sometimes demonstrates the operation of aircraft instruments in flight operations	Demonstrates the operation of aircraft instruments in flight operations with assistance
Ability to design a route plan for an aircraft in flight operations	Comprehensively designs a route plan for an aircraft in flight operations	Designs a route plan for an aircraft in flight operations	Designs a route plan for an aircraft in flight operations leaving out a few steps	Designs a route plan for an aircraft in flight operations with guidance

STRAND 4.0: AIRPORT OPERATIONS

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Airport Operations	4.1 Terminal Operations	By the end of the sub strand, the learner should be able to: a) describe the types of terminal operations in airport operations, b) explain the processes of terminal operations in an airport, c) illustrate the terminal layout in airport operations, d) simulate terminal operations in an airport, e) appreciate the importance of terminal operations in air transport.	The learner is guided to: • use the internet to search for information on the types of terminal operations (<i>passenger, baggage, cargo</i>), • use audio-visual device to watch video clips and discuss the processes of terminal operations of an airport (<i>check-in, security screening, customs, boarding baggage tagging</i>) • use drawing equipment to sketch terminal layout in airport operations (<i>check-in, security screening, customs, boarding baggage tagging</i>) • role-play the process of terminal operations in an airport, • participate in an excursion to a nearest aerodrome to observe	What is the importance of terminals in airport operations?

			the activities related to terminal operations.	
Core Competencies to be developed: • Communication and collaboration: the learner speaks clearly and engagingly when role-playing the process of terminal operations in an airport operation. • Citizenship: the learner engages effectively with peers when participating in an excursion to the nearest aerodrome to observe the activities related to terminal operations. • Digital literacy: the learner uses digital learning platforms when searching on the internet for information on the types of terminal operations.				
Values: • Respect: the learner listens carefully when he/she engages with a resource person on the careers related to terminal operations in airport operations. • Social justice: the learner ensures inclusion when role playing the process of terminal operations in an airport operation. • Patriotism: the learner obeys laws and regulations when visiting the nearest aerodrome to observe the activities related to terminal operations.				
Pertinent and Contemporary Issues (PCIs): • Civic responsibility: the learner complies with the regulations when touring an aerodrome to observe the activities related to terminal operations in airport operations. • Peer education: the learner shares what they have learnt with others when role-playing the process of terminal operations in an airport.				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Airport Operations	4.2 Ramp services	By the end of the sub strand, the learner should be able to: - describe ramp services in airport operations, - explain the procedures for ramp services in airport operations, - illustrate the ramp layout in an airport, - simulate the processes of ramp services in airport operations, - appreciate the process of ramp services in airport operations.	The learner is guided to: • search for information on the internet to identify ramp services in airport operations (<i>towing, chocking, refuelling, cleaning, catering, water/waste, loading & unloading</i>), • use visual aids and video clips to discuss the processes of ramp services in airport operations, • use drawing equipment to sketch ramp layout in airport operations (<i>apron, parking stand, boarding area</i>), • use an aircraft model to demonstrate the processes of ramp services in airport operations, • visit a nearby aerodrome to observe the activities related to ramp services.	What is the importance of ramp services in an airport?

Core Competencies to be developed: • Critical thinking and problem solving: the learner analyses complex information when using drawing equipment to sketch ramp layout in airport operations. • Learning to learn: the learner shares with peers what they have learnt when searching for information on the internet to identify ramp services in airport operations. • Citizenship: the learner engages effectively with peers when visiting a nearby aerodrome to observe the activities related to ramp services.
Values: • Respect: the learner accommodates diverse opinions when using visual aids and video clips to discuss the processes of ramp services in airport operations. • Social justice: the learner fosters harmonious relationships with others when searching for information on the internet to identify the types of airside operations.
Pertinent and Contemporary Issues (PCIs): Cyber safety: the learner practises responsible use of the internet when searching for information on the internet to identify ramp services in airport operations.

Suggested Assessment Rubric

Level Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Ability to describe the types of terminal operations in airport operations	Describes the types of terminal operations in airport operations giving examples	Describes the types of terminal operations in airport operations	Describes a few types of terminal operations in airport operations	Requires assistance to describe the types of terminal operations in airport operations
Ability to explain the processes of terminal operations in an airport	Systematically describes the processes of terminal operation in an airport	Describes the processes of terminal operation in an airport	Describes the processes of terminal operation in an airport leaving out a few steps	Describes the processes of terminal operation in an airport with prompt
Ability to illustrate the ramp layout in an airport	Comprehensively illustrates the arrangement of the terminal layout in an airport	Illustrates the arrangement of the terminal layout in an airport	Partially illustrates the arrangement of the terminal layout in an airport	Illustrates the arrangement of the terminal layout in an airport with guidance
Ability to simulate the processes of ramp services in airport operations	Comprehensively simulates the processes of ramp services in airport operations	Simulates the processes of ramp services in airport operations	Partially simulates the processes of ramp services in airport operations	Simulate the processes of ramp services in airport operations with assistance

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

Strand	Sub strand	Suggested assessment methods	Suggested learning resources	Suggested non-formal activities
1.0 Foundations of Aviation	1.1 Airfield Safety	• Oral assessment • Written assignment • Observation of learning activities • Portfolio	• Maps and charts of airfield layouts. • Video clips on airfield hazards and safety protocols. • Relevant aviation literature. • Multimedia equipment for video demonstrations and simulations.	• Visiting a local aerodrome to observe safety measures. • Participating in aviation clubs or societies focussing on airfield safety. • Engaging in community projects promoting awareness about bird strikes and environmental safety near airfields.
	1.2 Hangar Safety	• Oral assessment • Written assignments • Observation of learning activities • Portfolio	• Drawing tools and materials. • Aviation safety literature and manuals.	• Field visit to a local hangar to observe safety practices. • Participation in aviation clubs focusing on hangar safety.

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Strand	Sub strand	Suggested assessment methods	Suggested learning resources	Suggested non-formal activities
		• Reports or reflections on hazards observed during a hangar visit.	• Video clips on hangar hazards and safety protocols. • Safety materials and realia for demonstrations and simulations.	• Peer-led safety drills for hangar operations. • Community engagement projects to promote workplace safety awareness.
4.1 Aircraft Basic Construction	4.2 Aircraft Structures	• Written assignments • Oral assessment • Portfolio • Observation of learning activities	• Aviation manuals and literature. • Experimental kits/materials for stress demonstrations. • Aircraft hardware such as rivets, bolts, screws, nuts) • Modelling materials.	• Visit to a local aircraft maintenance organization to observe structural work. • Participation in aviation clubs focusing on aircraft construction.

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Strand	Sub strand	Suggested assessment methods	Suggested learning resources	Suggested non-formal activities
	4.3 Aircraft Propulsion I	- written assignments - Observation of learning activities - Oral assessment - Project assessment	- Experimental kits for jet engine thrust reaction demonstrations. - Aviation literature on aero piston engines. - Drawing tools for engine component sketches. - Multimedia elements for simulations. - Aircraft engine for demonstrations.	- Visit to an aircraft maintenance organization to observe engine construction and operation. - Participation in an aviation club focusing on propulsion systems.
	4.4 Aircraft Related Drawing: Orthographic Projection	- Written assignment - Observation of learning activities - Portfolio	- Print and digital materials on orthographic projection principles. - Drawing tools: rulers, compasses, protractors, set squares, and pencils.	- Participation in drawing competitions focusing on aircraft components. - Visits to aviation exhibitions showcasing technical drawings.

Strand	Sub strand	Suggested assessment methods	Suggested learning resources	Suggested non-formal activities
3.0 Flight Operations			- Aviation manuals with component diagrams. - Audio-visual materials on drawing interpretation.	
	3.1 Aircraft Controls	- Observation of learning activities - Written assessment - Oral assessment	- Relevant aviation literature on aircraft controls - Locally available materials for constructing flight control systems models. - Audio-visual devices and videos on flight control systems operations.	- Participation in aviation clubs to build and test aircraft control models. - Visits to aviation maintenance facilities to observe control systems.
	3.2 Flight Instruments	- Observation of learning activities - Written assignment - Oral assessment	Audio-visual devices and videos on instrument principles.	Participation in STEM clubs focusing on building and testing flight instrument models.

Strand	Sub strand	Suggested assessment methods	Suggested learning resources	Suggested non-formal activities
			- Charts and diagrams for instrument classification. - Locally available materials for model construction. - Flight simulation software.	- Visits to aviation training schools to observe instruments - Flight simulation software.
	3.3 Navigation	- Written test - Oral assessment - Observation of learning activities - Portfolio	- Aviation literature on airspace and navigation methods. - Audio-visual exercises for airspace classifications and navigation principles. - Drawing tools for route planning (compass, protractor, charts, maps).	- Participation in aviation clubs to simulate route planning and navigation. - Visits to air traffic control centres to observe navigation practices.

Strand	Sub strand	Suggested assessment methods	Suggested learning resources	Suggested non-formal activities
			Audio-visual devices for navigation method videos.	
4.0 Airport Operations	4.1 Terminal Operations	- Observation of learning activities - Oral assessment - Project assessment - Written assessment	- Internet access for researching terminal operations. - Audio-visual materials (videos on terminal processes). - Drawing tools (pencils, rulers, and templates for layout sketches). - Passes to access airports or aerodrome facilities	- Participation in excursions to observe terminal operations at a local aerodrome. - Engagement in role-play activities simulating real-world terminal operations in clubs and societies

Strand	Sub strand	Suggested assessment methods	Suggested learning resources	Suggested non-formal activities
	4.2 Airport Business Services	• Observation of learning activities • Oral assessment • Written assessment • Portfolio	• Audio-visual materials (videos on ramp service procedures). • Drawing tools (pencils, rulers, templates for ramp layout sketches). • Aircraft models for process demonstrations.	• Participation in field trips to observe ramp services at a local aerodrome. • Joining aviation clubs to discuss and simulate ramp operations.