SENIOR SCHOOL CURRICULUM DESIGN

GRADE 10

AVIATION TECHNOLOGY

KENYA INSTITUTE OF CURRICULUM DEVELOPMENT
2024

KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

Nurturing Every Learner's Potential

SENIOR SECONDARY SCHOOL CURRICULUM DESIGN

GRADE 10

AVIATION TECHNOLOGY

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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 removing conflicts and promoting positive attitudes of mutual respect which enable them to live together in harmony and foster patriotism in order to make a positive contribution to the life of the nation.

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

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.

LEVEL LEARNING OUTCOMES

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.

THE SENIOR SCHOOL IN THE COMPETENCY BASED CURRICULUM (CBC)

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

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

PROPOSED LIST OF SUBJECTS AT SENIOR SCHOOL

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

LESSON DISTRIBUTION AT SENIOR SCHOOL

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

ESSENCE STATEMENT

Aviation Technology explores the dynamic world of flight, equipping learners with the fundamental knowledge and skills to understand aircraft construction, flight, and airport operations. It is designed to align a learner to the Technical Studies track in line with the Science Technology, Engineering and Mathematics (STEM) pathway. Aviation technology is anchored on Kenya Vision 2030 and Sessional Papers No. 1 of 2015 and No. 1 of 2019, with the goal of equipping learners with the necessary skills and knowledge to contribute to the growth and efficiency of the aviation industry. This educational focus aims to foster economic development, enhance connectivity, and support the tourism and trade sectors, which are vital to Kenya's economic growth.

Through hands-on experiences, learners develop a comprehensive understanding of the science and technology behind aviation. This will enable them to analyze, design, and construct basic aircraft models, comprehend the importance of aviation safety procedures, and appreciate aviation's impact on society and the environment. The knowledge will promote the social, economic, and industrial needs of the aviation industry. By engaging with real-world applications and emerging technologies, learners gain the skills and knowledge necessary to pursue diverse career opportunities, enhance the efficiency and safety of the aviation industry, and engage with a global community.

SUBJECT GENERAL LEARNING OUTCOMES

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

1. Develop understanding of Aviation Technology theories, concepts, principles, and operations.
2. Acquire safety awareness and practices observed when working in the aviation field.
3. Appreciate appropriate acceptable standards for weather, human and environmental factors in flight operations.

4. Relate positively with members of the society when executing tasks related to Aviation Technology.
5. Develop financial and consumer literacy skills in Aviation entrepreneurship.
6. Read, interpret, and apply aircraft related drawings.
7. Identify career opportunities available in the Aviation industry.
8. Understand and apply emerging technologies and environmental sustainable practices in the Aviation industry.

SUMMARY OF STRANDS AND SUB STRANDS

Strands	Sub Strands	Suggested Number of Lessons
1.0 Foundations of Aviation Technology	1.1 Introduction to Aviation Technology	10
	1.2 Safety in the Aviation Workplace	15
	1.3 Airport Safety	20
2.0 Aircraft Basic Construction	2.1 Aircraft Components	10
	2.2 Aircraft Tools and Materials	20
	2.3 Aircraft Related Drawing: Isometric Drawing	20
3.0 Flight Operations	3.1 Aviation Weather	15
	3.2 Aviation Communication	15
	3.3 Aerodynamics of Flight	15
4.0 Airport Operations	4.1 The Airport	20
	4.2 Airport Business Services	20
Total Number of Lessons		**180**

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

STRAND 1.0: FOUNDATIONS OF AVIATION TECHNOLOGY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Foundations of Aviation Technology	**1.1 Introduction to Aviation Technology** **(10 lessons)**	By the end of the sub strand, the learner should be able to: a) explain the historical milestones in the development of aircraft, b) relate the contribution of key pioneers to the development of aircraft, c) categorise the types of aircraft in aviation, d) demonstrate heavier and lighter-than-air aircraft in aviation, e) evaluate the functions of different types of aircraft in aviation, f) appreciate the milestones of aircraft development in the aviation industry.	The learner is guided to: ● search on the internet using digital devices to watch video clips on the key historical milestones in the evolution of Aviation Technology (*hot air balloon, glider, fixed wing, rotary wing*), ● use charts to showcase the historical milestones in the evolution of aviation technology, ● discuss the contribution of key pioneers to the development of aviation technology (*Montgolfier brothers, George Cayley, Wright brothers, Igor Sikorsky*), ● use visual aids and digital devices to search for information on various types of aircraft, ● develop a checklist on the different types of aircraft.	1. What are the benefits of studying Aviation Technology? 2. Why is the history of Aviation important?

			● use a chart to categorise aircraft as either lighter or heavier than air aircraft, ● use an inflated balloon to create lighter-than-air aircraft, ● construct a kite or a hand glider using locally available materials to create heavier-than-air aircraft, ● brainstorm on the functions of different types of aircraft in aviation, ● tour a local aerodrome and observe different types of aircraft.	

Core Competencies to be developed:

- Digital literacy: the learner interacts with digital technology when searching on the internet to watch video clips on the key historical milestones in the evolution of aviation technology
- Communication and collaboration: the learner speaks clearly and effectively when discussing with peers the contribution of key pioneers to the development of aviation technology
- Creativity and imagination: the learner makes observations when undertaking the construction of a kite or a hand glider to demonstrate heavier-than-air aircraft
- Critical thinking and problem solving: the learner follows instructions when using balloons to demonstrate lighter-than-air aircraft

Values:

- Unity: the learner collaborates with peers when discussing the contribution of key pioneers to the development of aviation technology
- Responsibility: the learner demonstrates care for digital devices when watching video clips on the key historical milestones in the evolution of aviation technology
- Respect: the learner accommodates diverse opinions when discussing the contribution of key pioneers to the development of aviation technology

Pertinent and Contemporary Issues (PCIs):

- Analytical thinking: the learner examines relevant information when developing a checklist on different types of aircraft
- Safety: the learner complies with instructions when touring a local aerodrome to observe different types of aircraft
- Social cohesion: the learner positively interacts with peers when using charts to showcase the historical milestones in the evolution of aviation technology

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Foundations of Aviation Technology	**1.2 Safety in the Aviation Workplace** **(15 lessons)**	By the end of the sub strand, the learner should be able to: a) explain the general rules related to personal safety in the aviation workplace, b) describe the hazards related to personal safety in the aviation workplace, c) classify common injuries related to safety in the aviation workplace, d) perform first aid procedures related to injuries in the aviation workplace, e) appreciate the role of safety in the aviation workplace.	The learner is guided to: ● search for information on the internet to discuss the general rules relating to personal safety in the aviation workplace (*classroom, workshop, environment*), ● use visual aids and watch video clips on the hazards to personal safety in the aviation workplace (*classroom, workshop, environment*), ● discuss the common injuries related to safety in the aviation workplace (*cuts, burns, scalds, fractures, electric shock injuries*), ● use a checklist to categorise injuries related to safety in the aviation workplace (*minor, serious, fatal*) and present it to the class,	1. Why is personal safety important in the aviation field? 2. What causes injuries in the aviation workplace?

			• use realia to identify the contents of a first aid kit. • discuss the first aid procedures related to safety in the aviation workplace (*cuts, burns, scalds, fractures, electric shock, cardiopulmonary resuscitation*), • role-play the first aid procedures on the handling of injuries related to safety in the aviation workplace, • visit a local aerodrome and observe the safety practices in the aviation workplace, • engage with a resource person on the importance of safety in the aviation workplace.	

Core Competencies to be developed:

- Learning to learn: the learner seeks advice and information when engaging with a resource person on the importance of safety in the aviation workplace.
- Communication and collaboration: the learner speaks clearly and effectively when making a presentation to the class on the categories of injuries
- Digital literacy: the learner uses digital platforms when searching and discussing the general rules relating to personal safety in the aviation workplace

● Citizenship: the learner develops an appreciation of the local aerodrome when touring to observe the safety practices in the aviation workplace
Values: ● Love: the learner portrays a caring attitude for others when role-playing the first aid procedures for handling injuries related to safety in the aviation workplace ● Responsibility: the learner demonstrates care of realia when identifying the contents of a first aid kit ● Unity: the learner collaborates with others when discussing the first aid procedures related to personal safety in the aviation workplace
Pertinent and Contemporary Issues (PCIs): ● Group dynamics: the learner contributes when discussing the general rules relating to personal safety in the aviation workplace ● First Aid: the learner discusses with peers the first aid procedures related to safety in the aviation workplace ● Social skills: the learner positively interacts with peers when role-playing the first aid procedures on handling of injuries

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Foundations of Aviation Technology	**1.3 Airport Safety** **(20 lessons)**	By the end of the sub strand, the learner should be able to: a) explain the safety measures in the main areas of an airport, b) classify the common safety signs in the main areas of the airport, c) describe the general safety rules related to movement in the main areas of an airport, d) demonstrate the general safety measures related to movement in an airport, e) appreciate the careers related to safety in an airport.	The learner is guided to: ● search the internet for information on the main areas of an airport (*landside, airside, terminal*), ● discuss the main areas of an airport (*landside, airside, terminal*), ● use visual aids and video clips to explore the safety measures in the main areas of an airport (*landside, airside, terminal),* ● use aviation books and other related literature to discuss the common safety signs in the main areas of an airport (*mandatory, prohibition, information*), ● use charts to categorise the common safety signs in the main areas of the airport (*mandatory, prohibition, information*), ● discuss the general safety rules related to movement in the main areas of an airport (*landside, airside, terminal*),	1. Why is safety important in an airport? 2. How can one promote safety in an airport?

			● role-play the general entry and exit safety measures in an airport using locally available resources, ● visit a local aerodrome to observe activities related to safety in an airport.	

Core Competencies to be developed:

- Digital literacy: the learner interacts with digital devices when using the internet to search for information on the main areas of an airport
- Communication and collaboration: the learner works in groups when simulating the general entry and exit safety measures in an airport
- Learning to learn: the learner shares what they have learned when discussing the safety measures in the main areas of an airport
- Creativity and imagination: the learner undertakes drawing and preparation of a gallery walk to classify the common safety signs in the main areas of the airport

Values:

- Unity: the learner collaborates with peers when working in groups to discuss the general safety rules related to movement in the main areas of an airport
- Responsibility: the learner demonstrates care for visual aids when discussing the safety measures in the main areas of an airport
- Patriotism: the learner obeys rules and regulations when visiting a local aerodrome to observe activities of career personnel related to safety in an airport

Pertinent and Contemporary Issues (PCIs):

- Social cohesion: the learner positively relates with peers when discussing the safety measures in the main areas of an airport

- Resource mobilization: the learner collects locally available resources for simulating the entry and exit safety measures in an airport
- Safety and security: the learner complies with the safety rules when visiting a local aerodrome to observe activities related to safety in an airport

Suggested Assessment Rubric

Level / Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Ability to explain the historical milestones in the development of aircraft	Comprehensively explains the historical milestones in the development of aircraft	Explains the historical milestones in the development of aircraft	Explains the historical milestones in the development of aircraft leaving out a few details	Explains the historical milestones in the development of aircraft leaving out many details
Ability to perform first aid procedures related to injuries in the aviation workplace	Systematically performs first aid procedures related to injuries in the aviation workplace	Performs first aid procedures related to injuries in the aviation workplace	Performs first aid procedures related to injuries in the aviation workplace leaving out a few steps	Performs first aid procedures related to injuries in the aviation workplace leaving out many steps
Ability to demonstrate the general safety measures related to movement in an airport	Systematically demonstrates the general safety measures related to movement in an airport	Demonstrates the general safety measures related to movement in an airport	Demonstrates the general safety measures related to movement in an airport leaving out a few steps	Demonstrates the general safety measures related to movement in an airport leaving out many steps

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 Components** **(10 lessons)**	By the end of the sub strand, the learner should be able to: a) explain the functions of the parts of an aircraft in aviation, b) illustrate the parts of an aircraft in aviation, c) model a heavier-than-air aircraft in aviation, d) appreciate the role of different parts in the operation of an aircraft in aviation.	The learner is guided to: ● search on the internet for information on the functions of the major parts of the aircraft, ● use audio visual devices to identify the major parts of an aircraft, ● discuss the functions of the major parts of an aircraft (*fuselage, wing, empennage, landing gear, power plant / main rotor, tail rotor*), ● use freehand sketches to illustrate the major parts of an aircraft and present to class (*fixed wing, rotary wing*), ● use locally available materials to create a model of a heavier-than-air aircraft, ● engage with a resource person on the role of different parts in the operation of an aircraft.	1. Why does an aircraft have different parts? 2. Why are some aircrafts regarded as lighter-than-air?

Core Competencies to be developed:

- Communication and collaboration: the learner engagingly speaks when discussing with peers the major parts of an aircraft in aviation
- Self-efficacy: the learner shows concerted attention to detail when making presentations to the class on the major parts of an aircraft in aviation
- Digital literacy: the learner connects to the internet and uses audio-visual aids when discussing the major parts of an aircraft in aviation

Values:

- Integrity: the learner uses locally available resources sparingly when constructing a model of a fixed and rotating wing aircraft in aviation
- Peace: the learner respects self and others when making freehand sketches to show the major parts of an aircraft in aviation
- Responsibility: the learner demonstrates care of audio-visual devices when discussing with peers the major parts of an aircraft in aviation

Pertinent and Contemporary Issues (PCIs):

- Resource mobilization: the learner collects and uses locally available resources when constructing an aircraft model in aviation
- Social skills: the learner interacts with peers when making presentations to the class on the major parts of an aircraft in aviation
- Cyber safety: the learner practices responsible use of the internet when searching for information on the functions of the major parts of an aircraft in aviation

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Aircraft Basic Construction	**2.2 Aircraft Tools and Materials** **(20 lessons)**	By the end of the sub strand, the learner should be able to: a) explain the properties of common materials used in aircraft construction, b) describe the functions of aircraft tools used in aircraft construction, c) describe the safety precautions observed in the use of aircraft tools in workshop practice, d) create a model of a heavier than air aircraft in aviation, e) maintain tools in aircraft construction,	The learner is guided to: ● search on the internet for information on the categories of aircraft materials in workshop practice (*metals, non-metals*), ● brainstorm on the properties of aircraft materials in workshop practice (*physical, mechanical*), ● perform experiments to investigate the properties of aircraft materials used in aircraft construction (*physical and mechanical*), ● use charts to categorise aircraft tools in construction (*non-powered, powered*), ● use realia to group the tools for aircraft construction according to functions (*cutting, striking, holding, marking, and measuring tools*),	1. How do the properties of materials influence aircraft construction? 2. Why are tools and materials important in aircraft construction?

		f) appreciate the use of tools and materials in aircraft construction.	● use digital devices to discuss the safety precautions observed in the use of tools and materials in aircraft construction, ● demonstrate the safe use of tools and materials in aircraft construction, ● use aircraft tools and materials to develop an aircraft model and present to class, ● practice care and maintenance of the tools and materials in aircraft construction, ● participate in an excursion to an aircraft maintenance organisation to observe the use of tools and materials in aircraft construction.	
Core Competencies to be developed: ● Communication and collaboration: the learner speaks engagingly when discussing the safety precautions observed in the use of aircraft tools in workshop practice ● Digital literacy: the learner connects to the internet when searching for information on the types of aircraft tools in workshop practice ● Learning to learn: the learner reflects on their work when practising care and maintenance of aircraft tools in workshop practice				
Values: ● Responsibility: observes safety when using aircraft tools to perform given tasks in workshop practice				

- Unity: the learner collaborates with others when participating in an excursion to an aircraft maintenance organisation to observe the use of aircraft tools in workshop practice
- Integrity: the learner applies laid down procedure when practicing care and maintenance of aircraft tools in workshop practice

Pertinent and Contemporary Issues (PCIs):

- Safety: the learner follows the laid down safety procedures when using aircraft tools to perform given tasks in workshop practice
- Social cohesion: the learner relates harmoniously with others when discussing the safety precautions observed in the use of aircraft tools in workshop practice
- Analytical thinking: the learner critically examines information when searching on the internet for information on the types of aircraft tools in workshop practice

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Aircraft Basic Construction	**2.3 Aircraft Related Drawing: Isometric Drawing** **(20 lessons)**	By the end of the sub strand, the learner should be able to: a) explain the characteristics of isometric drawing in aircraft construction, b) sketch aircraft components in isometric projection, c) draw shaped blocks in isometric projection, d) dimension isometric drawings in aircraft construction, e) appreciate the application of isometric projection in aircraft construction.	The learner is guided to: ● use print or digital media to search for information on characteristic of isometric drawings, ● use free hand sketches to illustrate aircraft components in isometric projection, ● discuss the steps in drawing aircraft components in isometric projection, ● use drawing instruments to illustrate aircraft components in isometric projection *(fuselage, wing, empennage, landing gear, power plant / main rotor, tail rotor)* ● use drawing instruments to construct shaped blocks in isometric projection, ● use drawing instruments to dimension isometric drawings in aircraft construction, ● visit an aircraft maintenance facility and observe the application of isometric drawings in aircraft construction.	1. Why are isometric drawings important in aircraft construction? 2. How are isometric drawings used in aircraft construction?

Core Competencies to be developed:

- Communication and Collaboration: learner develops speaking, listening and self-expression skills when brainstorming on the characteristics of isometric drawings.
- Digital literacy: learner interacts with technology when using print or digital media to search for information on characteristic of isometric drawings
- Critical thinking and Problem Solving: learner interprets information when dimensioning isometric drawings in aircraft construction.

Values:

- Responsibility: learner cares for the print or digital media as well as drawing instruments when learning how to draw three dimensional objects in isometric projection.
- Unity: learner cooperates with others when using digital devices to search for information and discussing characteristic of isometric drawings.

Pertinent and Contemporary Issues (PCIs):

- Social cohesion: learner develops ability to relate well with others as they brainstorm on the characteristic of isometric drawings.
- Safety: learner takes care of drawing equipment when dimensioning isometric drawings in aircraft construction

Suggested Assessment Rubric

Level / Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Ability to explain the functions of the major parts of an aircraft	Comprehensively explains the functions of the major parts of an aircraft in aviation	Explains the functions of the major parts of an aircraft in aviation	Explains a few functions of the major parts of an aircraft in aviation	Explain the functions of the major parts of an aircraft in aviation with assistance
Ability to use aircraft tools to perform given tasks in workshop practice	Consistently uses aircraft tools to perform given tasks in workshop practice	Uses aircraft tools to perform given tasks in workshop practice	Sometimes uses aircraft tools to perform given tasks in workshop practice	Uses aircraft tools to perform given tasks in workshop practice with assistance
Ability to draw to scale aircraft parts in orthographic projection	Distinctively draws to scale aircraft parts in orthographic projection	Draws to scale aircraft parts in orthographic projection	Draws to scale aircraft parts in orthographical projection leaving out a few details	Draws to scale aircraft parts accurately in orthographical projection with assistance

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 Aviation weather** **(15 lessons)**	By the end of the sub strand, the learner should be able to: a) explain the elements of weather in the atmosphere, b) describe the effects of the elements of weather on an aircraft in flight, c) analyse the types of clouds in flight operations, d) measure the elements of weather in flight operations. e) appreciate the role of aviation weather in flight operations	The learner is guided to: ● use audio-visual devices to discuss the elements of weather (*wind, temperature, pressure, humidity, clouds, and precipitation*), ● search on the internet for information and discuss the effects of the elements of weather on an aircraft, ● brainstorm on the effects of weather elements on an aircraft in flight, ● use visual aids to make a gallery walk on the effects of the elements of weather and present to the class, ● use aviation related literature to discuss the types of clouds in flight operations (*cirrus, stratus, cumulus*), ● use charts to draw the types of clouds in flight operations, ● use locally available resources to carry out experiments on the measurement of the elements of weather (*wind, temperature, humidity, precipitation*),	1. Why is the study of aviation weather important? 2. How does weather affect flight?

			● engage with a resource person on careers related to aviation weather, ● visit a local meteorological department to observe activities related to aviation weather.	

Core Competencies to be developed:

- Digital literacy: the learner interacts with technology when searching the internet for information on the science concepts related to flight
- Critical thinking and problem solving: the learner follows instructions when constructing an aerofoil section from locally available materials
- Communication and collaboration: the learner speaks clearly and engagingly when discussing with peers the application of the science concepts to flight
- Creativity and imagination: the learner gains new perspectives when illustrating airflow patterns over different body shapes in theory of flight

Values:

- Responsibility: the learner demonstrates care for digital devices when searching the internet for information on the science concepts related to flight
- Respect: the learner considers the views of peers when discussing with peers the application of science concepts to flight
- Unity: the learner collaborates with peers when constructing an aerofoil section to show the aerofoil nomenclature

Pertinent and Contemporary Issues (PCIs):

- Social skills: the learner relates harmoniously with peers when discussing with peers the application of science concepts to flight
- Analytical skills: the learner interprets air resistance when illustrating the airflow patterns over different body shapes in theory of flight
- Resource mobilization: the learner collects locally available resources for making a cut-out of an aerofoil section to show the aerofoil nomenclature

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Flight Operations	**3.2 Aviation Communication** **(15 lessons)**	By the end of the sub strand, the learner should be able to: a) identify the ICAO phonetics in aviation communication, b) interpret standard words and phrases in aviation communication, c) describe the transmission techniques used in aviation communication, d) perform aircraft marshalling signals in aviation communication, e) appreciate the careers related to aviation communication in aviation industry	The learner is guided to: ● search on the internet for information on the ICAO phonetics used in aviation communication, ● practice in pairs the pronunciation of ICAO phonetics used in aviation communication (*letters, numerals, time, call signs*), ● discuss the standard words and phrases in aviation communication (*ground-to-ground*), ● make a gallery walk on the standard words and phrases in aviation communication, ● role-play in pairs the meaning of standard words and phrases in aviation. communication (*ground-to-ground*), ● use digital devices to explain the transmission techniques used in aviation communication (*use of*	1. What is the importance of communication in aviation? 2. How does aviation communication influence flight operations?

			radio devices, listening and speaking), ● role-play in pairs the transmission techniques using locally available resources, ● in pairs demonstrate aircraft marshalling signals in aviation communication, ● practice the demonstration of aircraft marshalling signals in aviation communication, ● tour an aerodrome to observe communication in aviation industry	

Core Competencies to be developed:

- Digital literacy: the learner interacts with digital platforms when searching the internet for information on the science concepts related to flight
- Learning to learn: the learner reflects on their work when using a balloon and straw to demonstrate Newton's third law of motion
- Communication and collaboration: the learner speaks engagingly when discussing with peers the application of the science concepts to flight

Values:

- Unity: the learner strives to achieve a common understanding with peers when discussing with peers the application of the science concepts to flight
- Responsibility: the learner observes safety precautions when using a balloon and straw to demonstrate Newton's third law of motion

● Respect: the learner accommodates diverse opinions when discussing with others the application of science concepts to flight
Pertinent and Contemporary Issues (PCIs): ● Role modelling: the learner is influenced positively during interaction with a resource person on the careers related to theory of flight in aviation ● Problem solving: the learner interprets science concepts during the demonstration of the Bernoulli's principle using a venturi tube ● Assertiveness: the learner expresses their opinions when discussing with peers the application of the science concepts to flight

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Flight Operations	**3.3 Aerodynamics of flight** **(15 lessons)**	By the end of the sub strand, the learner should be able to: a) identify the physical properties of the atmosphere, b) explain the characteristics of the lower layers of the atmosphere, c) illustrate the axes of an aircraft in theory of flight, d) demonstrate the motion of an aircraft about its axes e) evaluate the forces that act on an aircraft in flight, f) acknowledge the effects of aerodynamic forces on an aircraft in flight.	The learner is guided to: ● search on the internet for information on the physical properties of the atmosphere (*temperature, pressure, density, and humidity*), ● use the international standard atmosphere chart to identify the layers of the lower atmosphere in theory of flight (*troposphere and stratosphere*), ● brainstorm on the characteristics of the layers of the lower atmosphere in theory of flight, ● use audio-visual devices to download and watch videos on the axes of the aircraft, ● use drawing equipment to draw the arrangement of the axes of the aircraft, ● use an aircraft model to show the motion of an aircraft about its axes,	1. How does an aircraft fly? 2. Why is science important to flight?

			• use aviation books and related literature books to identify the four forces that act on an aircraft in flight (*lift, thrust, weight, drag*), • brainstorm on the forces that act on an aircraft in flight, • participate in an excursion to a local aerodrome and observe aircrafts in flight.	

Core Competencies to be developed:

- Communication and collaboration: the learner speaks clearly and engagingly when role-playing in pairs the meaning of standard words and phrases in aviation communication
- Digital literacy: the learner interacts with technology when using digital devices to explain the transmission techniques used in aviation communication
- Self-efficacy: the learner clearly describes and gives focussed feedback when role-playing the transmission techniques

Values:

- Unity: the learner respects the opinions of peers when discussing the standard words and phrases used in aviation communication
- Responsibility: the learner demonstrates care when using digital devices to explain the transmission techniques used in aviation communication
- Integrity: the learner exhibits self-discipline when touring an aerodrome to observe aviation communication in flight operations

Pertinent and Contemporary Issues (PCIs):

- Safety: the learner complies with the rules when touring an aerodrome to observe communication in flight operations
- Assertiveness: the learner confidently expresses opinions when discussing the standard words and phrases used in aviation communication

- Social skills: the learner interacts harmoniously with peers when role-playing the transmission techniques using locally available resources

Suggested Assessment Rubric

Level / Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Ability to describe the effects of the elements of weather on an aircraft in flight	Describes and cites examples of the effects of the elements of weather on an aircraft in flight	Describe the effects of the elements of weather on an aircraft in flight	Describes a few effects of the elements of weather on an aircraft in flight	Describes the effects of the elements of weather on an aircraft in flight with assistance
Ability to interpret standard words and phrases in aviation communication	Consistently interprets standard words and phrases in aviation communication	Interprets standard words and phrases in aviation communication	Sometimes interprets standard words and phrases in aviation communication	Interprets standard words and phrases in aviation communication with guidance
Ability to perform the aircraft marshalling signals in aviation communication	Systematically performs the aircraft marshalling signals in aviation communication	Performs the aircraft marshalling signals in aviation communication	Performs aircraft marshalling signals in aviation communication leaving out a few steps	Performs aircraft marshalling signals in aviation communication with prompts
Ability to analyse the forces that act on an aircraft in flight	Critically analyses the forces that act on an aircraft in flight	Analyses the forces that act on an aircraft in flight	Analyses the forces that act on an aircraft in flight leaving out a few details	Analyses the forces that act on an aircraft in flight with assistance

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 The Airport** **(20 lessons)**	By the end of the sub strand, the learner should be able to: a) describe the categories of airports in aviation, b) explain the functions of the major areas of an airport, c) illustrate the arrangement of an airport layout in aviation, d) model a layout of the physical components of an airport, e) appreciate the role of an airport in the economy.	The learner is guided to: ● search for information on the internet to identify the categories of airports in aviation (*categories A, B, C, D and E*), ● brainstorm with peers on the identified categories of airports, ● use audio-visual aids to discuss with peers the functions of the major areas of an airport (*landside, airside and terminal*), ● use charts to draw the arrangement of an airport layout (*landside, airside and terminal*), ● use locally available materials to make a model of the physical components of an airport layout for presentation to the class, ● participate in an excursion to the nearest aerodrome to observe the activities related to airport operations.	1. Why is an airport important to the Aviation industry? 2. Why are there different categories of airports in aviation?

Core Competencies to be developed:

- Self-efficacy: the learner clearly states their strengths and limitations when creating a model of an airport layout for presentation to the class
- Critical thinking: the learner selects the types of locally available materials to use when creating a model of the physical components of an airport layout
- Citizenship: the learner engages effectively with peers when participating in an excursion to the nearest aerodrome to observe the activities related to airport operations
- Digital literacy: the learner uses digital learning platforms when searching on the internet for information on the categories of airports in aviation

Values:

- Responsibility: the learner observes safety when using audio-visual aids to identify the categories of airports
- Unity: the learner appreciates the efforts of peers when making a model of an airport layout for presentation to the class
- Respect: the learner accommodates diverse opinions when making contributions during group discussions on the functions of the physical components of an airport

Pertinent and Contemporary Issues (PCIs):

- Social cohesion: the learner relates harmoniously with peers when discussing the functions of the physical components of an airport layout
- Resource mobilization and utilization: the learner collects locally available materials for use when making a model of an airport layout

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Airport Operations	**4.2 Airport Business Services** **(20 lessons)**	By the end of the sub strand, the learner should be able to: a) identify key business services in airport operations, b) explain the services offered by key businesses in airport operations, c) describe the financial concepts in aviation business services, d) analyse the rights of consumers in airport operations, e) evaluate the roles of consumer protection agencies in airport operations, f) recognize the role of aviation businesses in airport operations.	The learner is guided to: ● use audio-visual aids to identify key business services in airport operations (*landside and airside*), ● discuss the services offered by key businesses in airport operations (*landside and airside*), ● use aviation related literature to discuss the financial concepts in aviation business services (*budgeting, revenue, expenses, profit/loss, savings, investment, and borrowing)* ● search on the internet for information on the rights of consumers in airport operations (*quality, information, health, safety and compensation*), ● discuss on the rights of consumers in an airport (*quality, information, health, safety and compensation*), ● engage with a resource person on the role of consumer protection agencies in airport operations (*ICAO, IATA, KCAA and KAA*),	1. Why are business services important in airport operations? 2. How are consumers protected in airport operations?

			● participate in an excursion to a local aerodrome to observe and relate the role of aviation businesses in airport operations.	

Core Competencies to be developed:

- Communication and collaboration: the learner speaks clearly and engagingly when discussing with peers on the services offered by the key businesses in airport operations
- Digital literacy: the learner interacts with digital learning platforms when using audio-visual devices to identify key business services in airport operations
- Learning to learn: the learner shares with peers what they have learnt when searching on the internet for information on the rights of consumers in airport operations
- Critical thinking: the learner shows to detail when discussing on the rights of consumers in airport operations

Values:

- Respect: the learner accommodates diverse opinions when discussing the financial concepts in aviation business services
- Social justice: the learner fosters harmonious relationships with others when searching the internet for information on the rights of consumers in airport operations
- Unity: the learner collaborates with peers when discussing the services offered by key businesses in airport operations

Pertinent and Contemporary Issues (PCIs):

- Role modelling: the learner is influenced positively when interacting with a resource person on the role of consumer protection agencies in airport operations
- Social cohesion: the learner accommodates diverse opinions from peers when discussing on the rights of consumers in airport operations
- Group dynamics: the learner collectively exchanges ideas when discussing with peers the financial concepts in aviation business services

Suggested Assessment Rubric

Level / Indicator	Exceeds expectation	Meets expectation	Approaches expectation	Below expectation
Ability to explain the functions of the major areas of an airport	Explains and cites examples of the major areas of an airport	Explains the functions of the major areas of an airport	Explains a few functions of the major areas of an airport	Explains the functions of the major areas of an airport with assistance
Ability to illustrate the arrangement of the airport layout in aviation	Comprehensively illustrates the arrangement of the airport layout in aviation	Illustrate the arrangement of the airport layout in aviation	Partially illustrates the arrangement of the airport layout in aviation	Illustrates the arrangement of the airport layout in aviation with guidance
Ability to analyse the rights of consumers in airport operations	Critically analyses the rights of consumers in airport operations	Analyses the rights of consumers in airport operations	Analyses a few rights of consumers in airport operations	Analyses the rights of consumers in airport operations with assistance
Ability to evaluate the roles of consumer protection agencies in airport operations	Comprehensively evaluates the roles of consumer protection agencies in airport operations	Evaluates the roles of consumer protection agencies in airport operations	Evaluates a few roles of consumer protection agencies in airport operations	Evaluates the roles of consumer protection agencies in airport operations with guidance

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 Technology	**1.1 Introduction to Aviation Technology**	• Oral assessment • Written assignment • Observation of learning activities • Portfolio	• Relevant video clips and picture on key historical milestones in the evolution of Aviation Technology. • Manilla papers and marker pens to make presentations on different types of aircraft.	Learners to tour a local aerodrome and observe different types of aircraft.
	1.2 Safety in the Aviation Workplace	• Oral assessment • Written assignments • Observation of learning activities • Portfolio	• Visual aids to watch video clips on the hazards to personal safety in the aviation workplace • Manilla papers to develop a checklist to categorise injuries related to safety in the aviation workplace • First aid kit.	Learners to visit a local aerodrome and observe the safety practices in the aviation workplace
	1.3 Airport Safety	• Observation of learning activities • Written assignments	• Digital devices connected with internet to search for information on the main areas of an airport	Learners to role-play the general entry and exit safety measures in an airport using locally

		• Oral assessment	• Manilla papers for developing charts to categorise the common safety signs in the main areas of the airport	available resources in the Aviation club
2.0 Aircraft Basic Construction	**2.1 Aircraft Components**	• Written assignments • Oral assessment • Portfolio • Observation of learning activities	• Drawing equipment to illustrate the major parts of an aircraft • Locally available materials to create a model of a heavier-than-air aircraft • Audio visual devices to identify the major parts of an aircraft	Learners to engage with a resource person on the role of different parts in the operation of an aircraft in the Aviation club
	2.2 Aircraft Tools and Materials	• Observation of learning activities • Oral assessment • Project assessment	• Assorted aircraft materials to perform experiments to investigate their properties • Digital devices connected with internet to search for information on categories of aircraft materials in workshop • Assorted aircraft tools to demonstrate the safe use	Learners to participate in an excursion to an aircraft maintenance organisation to observe the use of tools and materials in aircraft construction.

			of tools and materials in aircraft construction	
	2.3 Aircraft Related Drawing: Isometric Drawing	• Written assignment • Observation of learning activities • Portfolio	• Digital devices connected with internet to search for information on the characteristics of isometric drawing • Drawing papers to illustrate aircraft components in isometric drawing	Learners to visit an aircraft maintenance facility and observe the application of isometric drawings in aircraft construction.
3.0 Flight Operations	**3.1 Aviation weather**	• Observation of learning activities • Written assessment • Oral assessment	• Audio-visual devices to search on information on the elements of weather • Charts o develop a gallery walk on the effects of the elements of weather • Locally available resources to carry out experiments on the measurement of the elements of weather.	Learners to engage with a resource person on careers related to aviation weather in the Aviation club.
	3.2 Aviation Communication	• Observation of learning activities • Written assignment • Oral assessment	• Charts to make a gallery walk on the standard words and phrases in aviation communication	Learners to practice the demonstration of aircraft marshalling signals in aviation

			• Digital devices connected with internet to search for information on the ICAO phonetics used in aviation communication	communication in the Aviation club.
	3.3 Aerodynamics of flight	• Written test • Oral assessment • Observation of learning activities • Portfolio	• Drawing equipment to illustrate the arrangement of the axes of the aircraft • Aircraft models to show the motion of an aircraft about its axes • Audio-visual devices to download and watch videos on the arrangement of the axes of an aircraft	Learners to participate in an excursion to a local aerodrome and observe aircrafts in flight.
4.0 Airport Operations	**4.1 The Airport**	• Observation of learning activities • Oral assessment • Project assessment • Written assessment	• Digital devices connected with internet to search for information on the categories of airports in aviation • Charts to draw the arrangement of an airport layout • Locally available materials to make a model of the physical	Learner to participate in an excursion to the nearest aerodrome to observe the activities related to airport operations.

			components of an airport layout	
	4.2 Airport Business Services	• Observation of learning activities • Oral assessment • Written assessment • Portfolio	• Audio-visual aids to search for information on the key business services in airport operations • Aviation related literature to discuss the financial concepts in aviation business services	Learner to engage with a resource person on the role of consumer protection agencies in airport operations

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