KENYA INSTITUTE OF CURRICULUM DEVELOPMENT

A Skilled and Ethical Society

DIPLOMA IN TEACHER EDUCATION
PRE-PRIMARY AND PRIMARY

SCIENCE AND TECHNOLOGY
CURRICULUM DESIGN

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INTRODUCTION

The development of the curriculum for Diploma in Teacher Education for the Pre-Primary and Primary level **(DTE–PP&P)** is a critical milestone in the implementation of Competency Based Curriculum (CBC) in Kenya. The curriculum designs herein have been developed to prepare the teacher trainee to be able to effectively guide the learners at the Pre-Primary and Primary School level; that is from Pre-Primary One (PP1) to Grade Six (G6) in Basic Education.

It is envisaged that the teacher educator will guide the teacher trainees appropriately to embrace the shift from the Objective-Based to the Competency Based Curriculum which is hinged on use of learner-centred pedagogy for realisation of the stated expected learning outcomes. In addition, the emphasis on formative assessment to facilitate learning should be underscored as the basis for determining learner aptitude and performance. Other key aspects that have been introduced include structured micro-teaching, a longer period for the practicum and the introduction of specific Professional Courses that ensure congruence with the CBC vision, mission, pillars and guiding principles as enshrined in the *Basic Education Curriculum Framework* (KICD, 2017).

The DTE-PP&P curriculum seeks to develop the teacher to act as a facilitator in the learning process taking into consideration the different abilities and learning styles of individual target learners. The curriculum has been designed with emphasis on experiential and reflective learning to develop appropriate Pedagogical Content Knowledge (PCK); hence, the emphasis on integrated content and pedagogy for the student teachers while at college. This is to ensure that the student teacher is given adequate time to practice how to facilitate learning of the different strands prescribed in the curriculum designs.

The Curriculum designs for the DTE-PP&P are packaged according to courses of training as follows:

Professional Learning areas

1. Child Development and Psychology
2. Curriculum Studies
3. Educational Resources
4. ICT Integration in Education
5. Educational Assessment
6. Research Skills
7. Inclusive Education
8. Educational Leadership and Management
9. Sociological and Philosophical Foundations of Education
10. Historical and Comparative Foundations of Education
11. Micro Teaching
12. Practicum

Integrated Content and Pedagogy Learning areas

1. English
2. Kiswahili
3. Mathematics
4. Science and Technology
5. Agriculture
6. Home Science
7. Religious Education: CRE/IRE/HRE

8. Social Studies
9. Physical and Health Education
10. Art and Craft
11. Music
12. Indigenous Language
13. Foreign Languages: French/ Arabic/ German/ Mandarin (Chinese)/ KSL

REGULATIONS FOR DIPLOMA IN TEACHER EDUCATION -PRE-PRIMARY AND PRIMARY (DTE-PP&P)

Entry Requirements

The entry requirements for the Diploma in Teacher Education – Pre-Primary and Primary shall be **C Plain** Mean Grade in the Kenya Certificate of Secondary Education examination (KCSE) or its equivalent (as equated by the Kenya National Examinations Council (KNEC). The Special Needs Candidates (SNE) could be admitted with **C Minus (-)** Grade in KCSE or equivalent

Duration of Training

The duration for the Diploma in Teacher Education – Pre-Primary and Primary shall be **three years**.

Subjects Offered

The trainee undertaking the Diploma in Teacher Education – Pre-Primary and Primary (DTE –PP&P) shall take **ALL** courses specified in the DTE- PP&P curriculum; which includes Professional Courses and learning areas (subjects) related to the content in the Pre-Primary and Primary School Curriculum.

Micro-Teaching and Practicum

Micro Teaching shall be undertaken as a course and shall be a pre-requisite for the Practicum; hence a course design has been developed for it. There shall be two (2) school term practicum sessions for which guidelines shall be developed.

Award of the Diploma

To be awarded the Diploma in Teacher Education – Pre-Primary and Primary (DTE-PP&P), the candidate must achieve the following:

i) Complete the required hours for coursework and pass the stipulated assessment as directed by the Kenya National Examinations Council (KNEC).
ii) Complete the required hours for the Practicum and pass the stipulated assessment as directed by the Kenya National Examinations Council (KNEC).

Note: If the student teacher fails to meet the requirements for award of the Diploma in Teacher Education – Pre-Primary and Primary (DTE –PP&P) he/she will be allowed to repeat the specific component or learning area failed.

Grading

The Diploma in Teacher Education – Pre-Primary and Primary (DTE PP&P) shall be graded as stipulated by the Kenya National Examinations Council (KNEC).

TABLE 1: DISTRIBUTION OF PROFESSIONAL LEARNING AREAS

	SUBJECT	TERM 1	TERM 2	TERM 3	TERM 4	TERM 5	TERM 6	Sub Total	TERM 7 Micro Teaching - Subject Practicals	TERM 8	TERM 9	TOTAL FOR COURSE
PROFESSIONAL LEARNING AREAS												**PROFESSIONAL LEARNING AREAS (420 Hours)**
1.	**Child Development and Psychology**	10	10	10	10	10	10	60				
2.	**Curriculum Studies**	30	20	20	20			90				
3.	**Educational Resources**	10	10	10				30				
4.	**ICT Integration in Education**	10	10	10				30				
5.	**Educational Assessment**	10	10	10				30				
6.	**Research Skills**	10	10	4				24				
7.	**Inclusive Education**	10	10	10				30				
8.	**Educational Leadership and Management**				10	10	10	30				
9.	**Sociological and Philosophical Foundations of Education**				10	10	10	30				
10.	**Historical and Comparative Foundations of Education**				10	10	10	30				
11.	**Micro Teaching**	30						30				
SUB TOTAL		**120Hrs**	**80Hrs**	**80Hrs**	**60Hrs**	**40Hrs**	**40Hrs**	**414Hrs**				

TABLE 2: DISTRIBUTION OF CONTENT + PEDAGOGY (SUBJECTS)

CONTENT + PEDAGOGY (SUBJECTS)												
	SUBJECT	**TERM 1**	**TERM 2**	**TERM 3**	**TERM 4**	**TERM 5**	**TERM 6**	**SUB TOTAL**	**TERM 7 Micro Teaching - Subject Practicals**	**TERM 8**	**TERM 9**	**TOTAL FOR COURSE**
1	**English**	24	34	34	35	29	30	186	30	Practicum	Practicum	
2	**Kiswahili**	20	20	20	20	20	20	120	20			**CONTENT& PEDAGOGY (SUBJECTS) (1680 Hrs)**
3	**Mathematics**	30	30	30	30	30	30	180	30	300 Hours	300 Hours	
4	**Science and Technology**	20	20	20	20	20	20	120	30			**+ PRACTICUM (600Hrs)**
5	**Agriculture**	20	20	20	20	20	20	120	20			
6	**Home science**	20	20	20	20	20	20	120	20			
7	**Religious Education:- (CRE, IRE, HRE)**	20	20	20	20	20	20	120	20			
8	**Social Studies**	20	20	20	20	20	20	120	20			
9.	**Physical and Health Education**	10	10	10	30	30	30	120	30			
10.	**Art and craft**	10	30	30	10	20	20	120	20			
11.	**Music**	10	20	20	20	20	30	120	20			
12.	**Indigenous Languages**	10	20	20	20	30	20	120	20			
13	**Foreign Languages: French/ Arabic/ German/ Mandarin (Chinese)/ KSL**	10	10	10	30	30	30	120	20			
SUB TOTAL		230 Hrs	270 Hrs	270 Hrs	290 Hrs	310 Hrs	310 Hrs	1686Hrs				
TOTAL		**350**	**350**	**350**	**350**	**350**	**350**	**2100**	**300**	**300**	**300**	**3000 HRS**

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 equity 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 FOR DIPLOMA IN TEACHER EDUCATION - PRE-PRIMARY AND PRIMARY (DTE–PP&P)

By the end of the course the teacher trainee should be able to:

1. Model appropriate behaviour and values for Pre-Primary and Primary school learners to emulate for development of good citizenship
2. Communicate and collaborate effectively with learners, peers, parents and the community to create a conducive learning environment.
3. Use appropriate pedagogical approaches to facilitate learning for Pre-Primary and Primary school learners in and out of the classroom
4. Apply inclusive practices to support all Pre-Primary and Primary school learners including those with disabilities and special educational needs
5. Employ ICT skills in the learning process to enhance digital literacy
6. Employ appropriate assessment approaches to promote effective learning
7. Identify and nurture learner's potential and talents for appropriate placement and transition into Junior School.
8. Develop environmental conservation skills in Pre-Primary and Primary school learners to promote education for sustainable development
9. Create innovative and effective solutions to challenges in the learning process.
10. Integrate pertinent and contemporary issues in learning to enable learners to cope with daily challenges.

ESSENCE STATEMENT

Science is a discipline that deals with explanations and predictions about nature and the universe while Technology is a purposeful human activity that expands the dimensions of human possibilities. It is fundamental to understanding, representing, and interacting with our natural, physical and social environment. The teacher trainee will develop foundational and holistic approach to scientific concepts in order to efficiently facilitate learning.

The achievement of Vision 2030 greatly depends on Science, Technology and Innovation. Sessional Paper No.1 of 2005 highlights the fact that for a breakthrough towards industrialization, achievement of the desired economic growth targets and social development, a high priority needs to be placed on the development of human capital through education and training by promoting the teaching of science. Sessional Paper No. 1 of 2019 equally stresses the need for sustainable basic and higher education, with an emphasis on Science, Technology and Innovation. This makes it necessary for Science to be taught in Pre-Primary and Primary Education level hence the need for training Diploma in Teacher Education (DTE).

The study of science and technology at Diploma level aims at equipping the teacher trainee with knowledge, skills and attitudes necessary for teaching environmental activities, science and technology in Pre-Primary and Primary school respectively. The course also enables the teacher to participate in conserving the environment for sustainable development. This course is linked to other learning areas such as Home Science, Agriculture, Physical Education and Social Studies.

The suggested methods of instruction include; Inquiry Based Learning (IBL), Project Based Learning (PBL), Problem based learning (PBL) and Pedagogical Content Knowledge (PCK) (Shulman, 1986-87). These modes of instruction are anchored on John Dewey's social constructivist theory, which emphasizes on learning through hands-on activities and Vygotskian sociocultural theory (Vygotsky, 1986), which regards teacher knowledge as both dynamic and situated.

GENERAL LEARNING OUTCOMES

By the end of the course, the teacher trainee should be able to:

1. Use appropriate pedagogical and professional competencies to facilitate learning of Environmental Activities, Science and Technology.
2. Develop environmental conservation skills and attitudes to promote education for sustainable development.
3. Apply problem solving and critical thinking skills acquired from scientific and technological knowledge in life.
4. Apply digital literacy skills to ease comprehension of scientific concepts for learners in Pre-primary and primary school.
5. Select, develop and utilize appropriate instructional resources in learning of scientific concepts.
6. Integrate pertinent and contemporary issues to address personal, community and environmental challenges.
7. Appreciate the importance of Environmental Activities, Science and Technology as a foundation for career formation and further education and training.

STRAND 1.0 SCIENCE AND THE ENVIRONMENT

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key inquiry Questions
1.0 Science and the Environment	**1.1 Nature of science** **(4 Hours)**	By the end of the sub strand, the teacher trainee should be able to: a) explain the nature of science for enhanced science literacy, b) describe the scientific problem-solving process and related skills in nature, c) examine scientific concepts in the Environmental Activities curriculum designs, d) select relevant teaching and learning resources for teaching science, e) improvise appropriate teaching and learning resources to facilitate learning of science,	The teacher trainee to: • discuss the meaning of science. • explore the scientific problem- solving process, • apply scientific skills during the scientific problem-solving process, • study the essence statements for Environmental Activities, Science and Technology curriculum design and its link to the teaching of science, • discuss different teaching and learning resources in Environmental Activities, Science and Technology *(real objects, visual- aids, models, audio, audiovisual, science corner, laboratory*	1. What is the relevance of the scientific problem- solving process in everyday life? 2. Which are the best ways of acquiring resources for teaching and learning of science?

		f) analyse the essence statements for Environmental Activities, Science and Technology curriculum designs.	*apparatus and equipment, digital and online resources),* • develop locally available materials/resources to facilitate teaching and learning of science.	

Core competencies to be developed:

- **Pedagogical content knowledge** as the teacher trainee explores the scientific problem-solving process and discusses different teaching and learning resources used in facilitating learning Environmental Activities, Science and Technology.
- **Citizenship and Leadership** as the teacher trainee participates in planning, guiding and supervising learning activities in group work.

Values:

Unity and **respect** as the teacher trainee studies and discusses together with peers.

Suggested Formative Assessment Rubric

Level / Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to describe scientific problem-solving process and the related skills	Describes scientific problem-solving process and the related skills with in depth details	Describes the scientific problem-solving process and the related skills	Describes some scientific problem-solving process and the related skills with minimal details	Describes the scientific problem-solving process and the related skills with hints.
Ability to examine scientific concepts in	Examines scientific concepts in the	Examines scientific concepts in the	Examine scientific concepts in the	Examine scientific concepts in the

the Environmental Activities curriculum designs	Environmental Activities curriculum designs most thoroughly	Environmental Activities curriculum designs	Environmental Activities curriculum designs less thoroughly	Environmental Activities curriculum designs with prompts
Ability to select relevant teaching and learning resources for teaching science	Selects relevant teaching and learning resources for teaching science and technology most precisely	Selects relevant teaching and learning resources for teaching science and technology	Selects some relevant teaching and learning resources for teaching science and technology less precisely	Selects relevant teaching and learning resources for teaching science and technology without precision
Ability to improvise of appropriate teaching and learning resources to facilitate learning of science	Improvises a wide variety of appropriate teaching and learning resources to facilitate learning of science	Improvises appropriate teaching and learning resources to facilitate learning of science	Improvises most of the teaching and learning resources to facilitate learning of science correctly	Improvises few appropriate teaching and learning resources to facilitate learning of science correctly
Ability to analyse the essence statements for Environmental Activities, Science and Technology curriculum designs	Analyses the essence statements for Environmental Activities, Science and Technology curriculum designs most comprehensively	Analyses the essence statements for Environmental Activities, Science and Technology curriculum designs	Analyses the essence statements for Environmental Activities, Science and Technology curriculum designs less comprehensively	Analyses the essence statements for Environmental Activities, Science and Technology curriculum designs with hints

Strand	**Sub Strand**	**Specific Learning Outcomes**	**Suggested Learning Experiences**	**Suggested Key Inquiry**

				Questions
1.0 Science and the Environment	**1.2 Ecosystems** **(5 Hours)**	By the end of the sub strand, the teacher trainee should be able to: a) describe types of ecosystems in nature, b) explain the role of various abiotic and biotic factors in the ecosystem, c) relate adaptations of living organisms to their habitats, d) appreciate the different ecosystems in nature, e) select appropriate learning experiences for teaching scientific concepts and skills,	The teacher trainee to: • use print or non-print media to search for information on types of ecosystems, • make a PowerPoint presentation on types of ecosystems, • discuss how the abiotic factors influence the biotic factors in the ecosystem, • use print and non-print resources to search for information on the role of animals in the ecosystem, • use specimens, print or non-print resources, and other visual aids to study the adaptations of living organisms to their habitats, • conserve animal and plant habitat in the school and community environment, • present a lesson on components of the environment, • study the strands in the grade 6 Science and Technology curriculum design and identify the content areas in which integration	How are different types of ecosystem conserved?

		f) integrate the competency of citizenship in the learning of Science.	of citizenship has been prescribed, • discuss the content areas in which integration of citizenship has been prescribed in relation to sensitivity on environmental issues in the community.	
Core Competencies to be developed: **Pedagogical content knowledge** as the teacher trainee prepares, peer teaches and critiques lessons. **Communication and collaboration** as the teacher trainee discusses with peers about the content areas in which integration of citizenship has been prescribed in relation to sensitivity on environmental issues in the community.				
Values: **Responsibility** as the teacher trainee handles digital devices to carry out projects to address environmental issues in the community.				

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to describe types of ecosystems in nature	Describes all types of ecosystems in nature with in depth details	Describes all types of ecosystems in nature	Describes most of the ecosystems in nature correctly	Describes a few types of ecosystems in nature correctly
Ability to explain the role of various abiotic and biotic factors in the ecosystem	Explains the role of various abiotic and biotic factors in the ecosystem in depth	Explains the role of various abiotic and biotic factors in the ecosystem	Explains the role of various abiotic and biotic factors in the ecosystem with little	Explains the role of various abiotic and biotic factors in the ecosystem with no

	details and examples		details	details
Ability to relate adaptations of living organisms to their habitats	Relates adaptations of a wide range of living organisms to their habitats	Relates adaptations of living organisms to their habitats	Relates adaptations of a few living organisms to their habitats	Relates adaptations of few living organisms to their habitats with hints
Ability to select appropriate learning experiences for teaching scientific concepts and skills	Selects appropriate learning experiences for teaching scientific concepts and skills most precisely	Selects appropriate learning experiences for teaching scientific concepts and skills	Selects appropriate learning experiences for teaching scientific concepts and skills less precisely	Selects appropriate learning experiences for teaching scientific concepts and skills without precision
Ability to integrate the competency of citizenship in the learning of Science	Integrates the competency of citizenship in the learning of Science most efficiently	Integrates the competency of citizenship in the learning of Science	Integrates the competency of citizenship in the learning of Science less efficiently	Integrates the competency of citizenship in the learning of Science with prompts

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
1.0 Science and the Environment	**1.3 Environmental Activities** **(7 Hours)**	By the end of the sub strand, the teacher trainee should be able to: a) identify the causes, effects and control of water and air pollution, b) describe the causes, signs, symptoms, prevention and control of common water washed and water borne diseases, c) conserve plants,	The teacher trainee to: • use print and non-print media to search for information on causes, effects and control of water and air pollution, • use print and non-print media to search for information on the causes, signs, symptoms and control of water washed *(scabies, lice, ringworm, trachoma, conjunctivitis) and water borne diseases (typhoid, cholera, giardia, dysentery, Escherichia coli, hepatitis A),* • discuss and demonstrate ways of conserving water, plants and animals, • discuss and demonstrate ways of conserving water. *(reducing, reusing, and recycling),* • use digital devices and online	1. Why is the environment important to human life? 2. What is the significance of smell in an environment? 3. Why should we safely dispose waste? 4. How can we safely dispose waste?

		animals and water in the environment, d) describe ways of managing waste in the environment, e) integrate the core competency of learning to learn in learning of Environmental Activities.	sources to observe and demonstrate ways of conserving plants, animals and water, • sort out waste found in the environment, • design safe ways of handling waste in the community, • practise safe waste management in the environment, • practise the use of refusing, reducing, reusing, recycling and upcycling to manage solid waste in the environment, • investigate management of solid waste through income generation activities *(kitchen waste, animal waste, plastics, e- waste, metals and glasses),* • model a lesson on waste management, • use digital devices and online resources to access and share content on waste management and environmental conservation, • carry out activities to show how the core competency of learning to learn	

			can be developed in teaching and learning of Environmental Activities, **Project 1:** Making waste segregation dustbins, **Project 2**: Making toys, ornaments and other useful items from solid waste, **Project 3:** Identifying a conservation project and carrying it out in the institution.	
Core Competencies to be developed: • **Pedagogical content knowledge** as the teacher trainee prepares, peer teaches and critiques lessons. • **Citizenship and leadership** as the teacher trainee segregates and recycles/upcycles waste to conserve the environment. • **Critical thinking and problem solving** as the teacher trainee identifies and carries out a conservation project in the institution.				
Values: • **Responsibility** as the teacher trainee manages solid waste in the environment and learns methods of environmental conservation. • **Patriotism** as the teacher trainee conserves the environment.				

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to identify the causes, effects and control of water and air pollution	Identifies the causes, effects and control of water and air pollution with in depth details	Identifies the causes, effects and control of water and air pollution	Identifies the causes, effects and control of water and air pollution with less details	Identifies the causes, effects and control of water and air pollution without details (mentions)
Ability to describe the causes, signs, symptoms, prevention and control of common water washed and water borne diseases	Describes the causes, signs, symptoms, prevention and control of common water washed and water borne diseases with in depth details	Describes the causes, signs, symptoms, prevention and control of common water washed and water borne diseases	Describes the causes, signs, symptoms, prevention and control of common water washed and water borne diseases with less details	Describes the causes, signs, symptoms, prevention and control of common water washed and water borne diseases without details
Ability to conserve plants, animals and water in the environment, describe ways of managing waste in the environment	Conserves plants, animals and water in the environment most efficiently	Conserves plants, animals and water in the environment	Conserves plants, animals and water in the environment less efficiently	Conserves plants, animals and water in the environment inefficiently

Ability to describe ways of managing waste in the environment	Describes ways of managing waste in the environment with in depth details	describe ways of managing waste in the environment	describe ways of managing waste in the environment with minimal details	describe ways of managing waste in the environment without details
Ability to integrate the core competency of learning to learn in learning Environmental Activities	Integrates the core competency of learning to learn in learning Environmental Activities most efficiently	Integrates the core competency of learning to learn in learning Environmental Activities	Integrates the core competency of learning to learn in learning Environmental Activities less efficiently	Integrates the core competency of learning to learn in learning Environmental Activities inefficiently

STRAND 2.0 LIVING THINGS

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
2.0 Living things	**2.1 Classification of Living Things** **(5 Hours)**	By the end of the sub strand, the teacher trainee should be able to: a) describe the characteristics of living things based on their kingdoms, b) describe functions of parts of plants in the habitat, c) analyse the adaptation of plants in the environment, d) compare the characteristics of vertebrate and invertebrate	The teacher trainee to: • use specimens or other resources to find out the characteristics of the living things based on their kingdoms *(Monera, Protista, Fungi, Plantae and Animalia),* • identify animals in the locality so as to classify them into their classes, • use specimen to search for and compare the characteristics of flowering and non-flowering plants; harmful and non-harmful plants to children, • construct herbarium of plants in the local habitat and care for plants in the school environment, • use specimens, print or non-print media to search for and compare the characteristics of vertebrates and invertebrates, • discuss the characteristics of Fish, Amphibians, Reptiles, Birds and	1. Why is it necessary to classify living things into different taxa? 2. Why is it important to conserve plants diversity in the environment? 3. How can one initiate a plant diversity project? 4. Why is it important to conserve animal diversity in the environment? 5. How is animal diversity

		animals in nature, e) appreciate the importance of plant diversity in conserving the ecosystem, f) integrate the competency of communication and collaboration in teaching Science.	Mammals in the animal kingdom, • discuss the characteristics of Insecta, Arachnida, Chilopoda, Diplopoda and Mollusca in the animal kingdom, • use specimens, digital devices, online resources and other visual aids to observe and distinguish the characteristics of mammals, reptiles, fish, birds and amphibian, • draw differences of safe from dangerous animals for children in the environment, • present a lesson on classification of living things, • use a Science and Technology curriculum designs to design a learning activity that integrates communication and collaboration as prescribed, **Project 1:** Collect plants in the locality, dry, stick them on a surface, label and display them in the classroom.	important to the environment?
Core Competencies to be developed: • **Pedagogical content knowledge** as the teacher trainee prepares and peer teaches lessons on classification of living things. • **Digital literacy skills** as teacher trainee uses digital devices and online resources to access, study and present				

content on classification.
Values: **Respect** as the teacher trainee shares their findings on characteristics of different kingdoms, phyla and classes **Unity** as the teacher trainee works with peers in groups.

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to describe the characteristics of living things based on their kingdoms	Describes the characteristics of living things based on their kingdoms with in depth details	Describes the characteristics of living things based on their kingdoms	Describes the characteristics of living things based on their kingdoms with minimal details	Describes the characteristics of living things based on their kingdoms without details
Ability to describe functions of parts of plants in the habitat	Describes functions of parts of plants in the habitat with in depth details	Describes functions of parts of plants in the habitat	Describes functions of parts of plants in the habitat with minimal details	Describes functions of parts of plants in the habitat without details
Ability to analyse the adaptation of plants in the environment	Analyses the adaptation of plants in the environment most comprehensively	Analyses the adaptation of plants in the environment	Analyses the adaptation of plants in the environment less comprehensively	Analyses the adaptation of plants in the environment with hints
Ability to compare the characteristics of	Compares the characteristics of	Compares the characteristics of	Compares the characteristics of	Compares the characteristics of

vertebrate and invertebrate animals in nature	vertebrate and invertebrate animals in nature most comprehensively	vertebrate and invertebrate animals in nature	vertebrate and invertebrate animals in nature less comprehensively	vertebrate and invertebrate animals in nature with prompts
Ability to integrate the competency of communication and collaboration in teaching Science	Integrates the competency of communication and collaboration in teaching Science most efficiently	Integrates the competency of communication and collaboration in teaching Science	Integrates the competency of communication and collaboration in teaching Science less efficiently	Integrates the competency of communication and collaboration in teaching Science inefficiently

Strand	Sub strand	Specific learning outcomes	Suggested learning experiences	Suggested Key Inquiry Question(s)
2.0 Living things	**2.2 The cell.** (4 Hours)	By the end of the sub strand, the teacher trainee should be able to: a) compare the structure of plant and animal cells, b) describe the functions of different parts of a plant and animal cell, c) distinguish the processes of diffusion, osmosis and active transport and their effects on the living cells, d) demonstrate the processes of diffusion, osmosis and active transport in the living cells, e) examine the role of physiological processes in living things, f) appreciate the importance of physiological processes for normal functioning of living things,	The teacher trainee to: • prepare and observe temporary slides of plant cells under the light microscope, • study parts of the plant cell seen under the light microscope, • observe permanent slides of plant and animal cells under a light microscope and compare the observable structures, • discuss the functions of different parts of a plant and animal cell, • carry out activities to demonstrate diffusion, osmosis, plasmolysis and turgidity, • use print or non-print media to search for and discuss the differences among processes of diffusion, osmosis and active transport, • discuss the role of diffusion, osmosis and active transport in living	Why is it important to understand the cell and how it functions?

		g) integrate the competency of critical thinking and problem solving in teaching of science.	things and present their findings, • practise observing safety measures and show responsibility when carrying out the experiments, • plan and present 10 minute practical lessons on cell structure, • use grade 5 Science and Technology curriculum designs design a learning activity that integrates critical thinking and problem solving as prescribed, • design learning activities using locally available materials that can be used to demonstrate the working of a cell.	
Core Competencies to be developed: • **Pedagogical content knowledge** as the teacher trainee prepares lessons on cell structure. • **Digital literacy skills** as the teacher trainee uses digital devices and online resources to access content on cell structure and functions.				
Values: **Unity** as the teacher trainee works in groups with clearly assigned roles.				

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to compare the structure of plant and animal cells	Compares all aspects of the structure of plant and animal cells with in depth details	Compares all aspects of the structure of plant and animal cells	Compares most aspects of the structure of plant and animal cells correctly	Compares a few aspects of the structure of plant and animal cells correctly
Ability to describe the functions of different parts of a plant and animal cell	Describes the functions of different parts of a plant and animal cell with in depth details	Describes the functions of different parts of a plant and animal cell	Describes the functions of different parts of a plant and animal cell with minimal details	Describes the functions of different parts of a plant and animal cell without details
Ability to distinguish the processes of diffusion, osmosis and active transport and their effects on the living cells	Distinguishes all of the processes of diffusion, osmosis and active transport and their effects on the living cells with in depth details	Distinguishes all the processes of diffusion, osmosis and active transport and their effects on the living cells	Distinguishes most of the processes of diffusion, osmosis and active transport and their effects on the living cells correctly	Distinguishes few the processes of diffusion, osmosis and active transport and their effects on the living cells correctly
Ability to demonstrate the processes of diffusion, osmosis and active transport in the living cells	Clearly and evidently demonstrates all the processes of diffusion, osmosis and active transport in the living cells	Clearly demonstrates all the processes of diffusion, osmosis and active transport in the living cells	Demonstrates most of the processes of diffusion, osmosis and active transport in the living cells correctly	Demonstrates few the processes of diffusion, osmosis and active transport in the living cells correctly

Ability to examine the role of physiological processes in living things	Examines the role of physiological processes in living things most comprehensively	Examines the role of physiological processes in living things	Examines the role of physiological processes in living things less comprehensively	Examines the role of physiological processes in living things with prompts
Ability to integrate the competency of critical thinking and problem solving in teaching of science	Integrates the competency of critical thinking and problem solving in teaching of science most adequately	Integrates the competency of critical thinking and problem solving in teaching of science	Integrates the competency of critical thinking and problem solving in teaching of science less adequately	Integrates the competency of critical thinking and problem solving in teaching of science with hints

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living things	**2.3 The human body system** *Respiratory system, Cardiovascular system, Urinary system, Endocrine system, Nervous system, Muscular, Skeletal, Integumentary system/exocrine System, Lymphatic system and the Immune System* (6 hours)	By the end of the sub strand, the teacher trainee should be able to: a) explain the meaning of body systems in a human being, b) differentiate concepts related to the human body system, c) describe the major parts and functions of body systems in humans, d) prepare a model lesson to facilitate learning on selected body systems, e) appreciate healthy lifestyle for proper functioning of the body.	The teacher trainee to: • brainstorm on the meaning of body systems in a human being, • find out the meaning of some given concepts (organ, cell, tissues), • search for information on various body systems from print and non-print materials and make a presentation, • draw charts showing the various body systems, • model human body systems for display, • prepare a model lesson on the body systems.	Why is it important to understand the human body system?
Core Competencies to be developed: • **Pedagogical content knowledge** as the teacher trainee searches for information on human body systems. • **Digital literacy skills** as they use digital devices and online resources to access content on human body systems.				
Values: Respect and Unity as they work in groups to make presentation and make models of the human body systems				

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to explain the meaning of body systems in a human being	Explains the meaning of body systems in a human being with in depth details	Explains the meaning of body systems in a human being	Explains the meaning of body systems in a human being with minimal details	Explains the meaning of body systems in a human being without details
Ability to differentiate concepts related to the human body system	Differentiates all given concepts related to the human body system with details	Differentiates all given concepts related to the human body system	Differentiates most of the given concepts related to the human body system correctly	Differentiates one of the given concepts related to the human body system correctly
Ability to describe the major parts and functions of body systems in humans	Describes all the major parts and functions of body systems in humans most precisely	Describes all the major parts and functions of body systems in humans	Describes most of the major parts and functions of body systems in humans correctly	Describes a few of the major parts and functions of body systems in humans correctly
Ability to prepare a model lesson to facilitate learning on selected body systems	Prepares a model lesson to facilitate learning on selected body systems creatively and	Prepares a model lesson to facilitate learning on selected body systems	Prepares a model lesson to facilitate learning on selected body systems less creatively	Prepares a model lesson to facilitate learning on selected body systems without creativity

	innovatively			

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key inquiry Questions
2.0 Living things	**2.4 Microorganisms** (6 Hours)	By the end of the sub strand, the teacher trainee should be able to: a) explain terms used in microbiology, b) differentiate types of microorganisms in nature, c) describe the economic importance of microorganisms to humans, d) describe communicable and non-communicable diseases in human beings,	The teacher trainee to: • search for information on given terms *(microbiology, microorganisms and microbes),* • search for information on the types of microbes *(bacteria, viruses, fungi, protozoa)* and make a PowerPoint presentation, • find out the different features of microorganisms using available resources (microscope), • brainstorm on the benefits of microorganisms to humans and present to peers • discuss the harmful effects of the microorganisms *(bacteria, viruses and fungi),* • make a chart on common communicable diseases caused by bacteria, viruses and fungi,	1. Why is it important to study about microbes? 2. How would you help learners to identify common childhood diseases? 3. How would you promote good health in children?

		e) examine ways of managing common childhood diseases, f) describe the role of vaccines in preventing diseases, g) analyse the effects of second hand smoking on children, h) examine the causes and mitigation measures of injuries experienced by learners, i) examine contemporary and pertinent issues related to microorganisms in the world,	• discuss disease causing parasites, transmission, effects and prevention/management of parasites in children, • search for information on common childhood diseases *(Measles, Diphtheria, Polio, Whooping cough (pertussis), Tuberculosis, Hepatitis A and B, Malaria, Yellow fever, Chicken pox, Influenza, Pneumonia, Mumps, Rotavirus, Rubella (German measles), Tetanus, Meningitis, worms),* • use print and electronic media to search for information on common childhood diseases *(causes, signs and symptoms, prevention),* • search for information on prevention and management of childhood diseases, • design strategies to take to prevent and manage common illness in children in schools, • search for information on the harm of second hand smoking	

		j) recognise the diversity of microorganisms.	*(frequent and severe asthma attacks, respiratory infections, ear infections, and sudden infant death syndrome (SIDS),* • mitigate the harm caused by second hand smoking in children, • prepare and present a lesson on child safety *(causes and mitigation measures of injuries involving learners)* to learners in Grade 3 or lower grades, • make a video clip demonstrating effective First Aid and management techniques for children involved in non-intentional injuries *(falls, choking, cuts, suffocation, burns, poisoning, drowning, strangulation)* in pre-primary and primary school learners, • role play effective First Aid techniques for children involved in injuries in school, • search for information on road traffic injuries and fatalities involving learners in pre-primary	

			and primary schools, • carry out a presentation in plenary to demonstrate the mitigation measures for road injuries and fatalities involving learners *(school and community),* • discuss safety measures in schools that aim to prevent injuries in children, • **Project:** Carry out parental and community education on promotion of health in the child, family and community. • search and write a paper on some contemporary and pertinent issues related to harmful microorganisms.	
Core Competencies to be developed: • **Pedagogical content knowledge** as the teacher trainee searches for information on microorganism. • **Digital literacy skills** as the teacher trainee uses digital devices and online resources to access content on microorganisms.				
Values: **Respect** and **Unity** as the teacher trainee works in groups when discussing about microorganisms or use the microscope.				

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to explain terms in microbiology	Explains all the given terms in microbiology with in depth details	Explains all given terms in microbiology	Explains most of the given terms in microbiology correctly with minimal details	Explains a few of the given terms in microbiology correctly with hints
Ability to differentiate types of microorganisms in nature	Differentiates all types of microorganisms in nature with in depth details	Differentiates all types of microorganisms in nature	Differentiates most of the types of microorganisms in nature correctly with minimal details	Differentiates a single type of microorganisms in nature correctly with prompts
Ability to describe the economic importance of microorganisms to humans	Describes the economic importance of microorganisms to humans with in depth details	Describes the economic importance of microorganisms to humans	Describes the economic importance of microorganisms to humans with minimal details	Describes the economic importance of microorganisms to humans without details
Ability to describe communicable and non-communicable diseases in human beings	Describes all common communicable and non-communicable diseases in human beings with in depth details	Describes all common communicable and non-communicable diseases in human beings	Describes most of the common communicable and non-communicable diseases in human beings with in depth details	Describes a few of either communicable or non-communicable diseases in human beings without details
Ability to examine	Examines ways of	Examines ways of	Examines ways of	Examines ways of

ways of managing common childhood diseases	managing common childhood diseases applicable most comprehensively	managing common childhood diseases	managing common childhood diseases less comprehensively	managing common childhood diseases with prompts
Ability to describe the role of vaccines in preventing diseases	Describes the role of vaccines in preventing diseases most precisely	Describes the role of vaccines in preventing diseases	Describes the role of vaccines in preventing diseases less precisely	Describes the role of vaccines in preventing diseases with hints
Ability to analyse the effects of second hand smoking on children	Analyses the effects of second hand smoking on children with in depth details	Analyses the effects of second hand smoking on children	Analyses the effects of second hand smoking on children with minimal details	Analyses the effects of second hand smoking on children without details
Ability to examine the causes and mitigation measures of injuries experienced by learners	Examines the all the causes and mitigation measures of injuries experienced by learners with in depth details	Examines all the causes and mitigation measures of injuries experienced by learners	Examines most of the causes and mitigation measures of injuries experienced by learners correctly	Examines a few of the causes and mitigation measures of injuries experienced by learners correctly
Ability to examine contemporary and pertinent issues related to microorganisms in the world	Examines contemporary and pertinent issues related to microorganisms in the world with in depth details	Examines contemporary and pertinent issues related to microorganisms in the world	Examines contemporary and pertinent issues related to microorganisms in the world with minimal details	Examines contemporary and pertinent issues related to microorganisms in the world without details

Strand	Sub strand	Specific learning outcomes	Suggested learning experiences	Suggested Key Inquiry Questions
2.0 Living Things	**2.5 Gaseous exchange in plants and animals** **(4 lessons)**	By the end of the sub strand, the teacher trainee should be able to: a) relate the structure of the leaf to gaseous exchange in plants, b) correlate the structure of the lenticel to gaseous exchange in plants, c) describe the mechanism of gaseous exchange in insects, fish, amphibians and human beings, d) appreciate the importance of keeping the gaseous exchange system healthy, e) integrate competency of self- efficacy in teaching and learning	The teacher trainee to: • observe leaves or use print and non-print media to identify the external and internal structures of the leaf and relate them to the function of gaseous exchange, • use digital devices, online resources and other visual aids to observe the structure of the lenticel and relate it to gaseous exchange, • use digital devices and other resources to explore the mechanism of gaseous exchange in insects, fish, amphibians and human beings, • design and present a lesson on breathing system in human beings, • use grade 4 Science and Technology curriculum designs to design a learning activity that integrates the competency of Self Efficacy.	1. How does gaseous exchange take place in animals? 2. How are the gaseous exchange organs adapted to their functions?

		gaseous exchange.		

Core Competencies to be developed:

- **Digital literacy skills** as the teacher trainee uses digital devices and online resources to develop, access and observe content on gaseous exchange.
- **Pedagogical content knowledge** as the teacher trainee prepares lessons for peer teaching.

Values:

Unity and **Respect** as the teacher trainee works in groups with clearly assigned roles.

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to relate the structure of the leaf to gaseous exchange in plants	Relates the structure of the leaf to gaseous exchange in plants most precisely	Relates the structure of the leaf to gaseous exchange in plants	Relates the structure of the leaf to gaseous exchange in plants less precisely	Relates the structure of the leaf to gaseous exchange in plants without precision
Ability to correlate the structure of the lenticel to gaseous exchange in plants	Correlates the structure of the lenticel to gaseous exchange in plants most precisely	Correlates the structure of the lenticel to gaseous exchange in plants	Correlates the structure of the lenticel to gaseous exchange in plants less precisely	Correlates the structure of the lenticel to gaseous exchange in plants without precision
Ability to describe the mechanism of gaseous exchange in insects, fish, amphibians and	Describes the mechanism of gaseous exchange in all the given animals with in depth details	Describes the mechanism of gaseous exchange in all the given animals	Describes the mechanism of gaseous exchange in all the given animals with minimal details	Describes the mechanism of gaseous exchange in all the given animals without details

human beings				
Ability to integrate competency of self-efficacy in teaching and learning gaseous exchange	Integrates competency of self-efficacy in teaching and learning gaseous exchange most efficiently	Integrates competency of self-efficacy in teaching and learning gaseous exchange	Integrates competency of self-efficacy in teaching and learning gaseous exchange less efficiently	Integrates competency of self-efficacy in teaching and learning gaseous exchange inefficiently

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Living Things	**2.6 Transport in Plants** (5 Hours)	By the end of the sub strand, the teacher trainee should be able to: a) describe the adaptation of the plant root to its functions, b) relate the structure of xylem and phloem to their functions in plants, c) describe the absorption of water and uptake of mineral salts in plants, d) demonstrate the process of transpiration in plants, e) examine the factors affecting the rate of transpiration in plants, f) relate the internal	The teacher trainee to: • discuss the relationship between the internal structure of roots and root hairs to their functions, • use digital devices, online resources and other visual aids to observe the structures of xylem and phloem, and relate it to their functions, • use digital devices and online resources to observe and discuss translocation through the phloem, • carry out an experiment to demonstrate absorption and uptake of water and mineral salts in plants, • carry out an activity to demonstrate transpiration in plants and record their observations, • brainstorm on the factors that	How is transport in plants important?

		structure of the leaf to transpiration in plants, g) describe the process of translocation in plants, h) appreciate the importance of transport in plants, i) develop lesson learning outcomes for teaching transport in plant for primary school learners.	affect the rate of transpiration, • use digital devices and online resources to observe the internal structure of the leaf and its relationship to transport in plants, • write an essay on the relationship between the internal structure of the leaf and transpiration, • use Science and Technology curriculum designs to generate lesson learning outcomes on transport in plants.	
Core Competencies to be developed: • **Pedagogical content knowledge** as the teacher trainee prepares, peer teaches and critiques lessons. • **Assessment competency** as the teacher trainee prepares assessment rubrics for lessons. • **Digital literacy skills** as the teacher trainee uses digital devices and online resources to search for information on transport in plants.				
Values: Responsibility and patriotism as they learn about the plants in the environment and take care of the environment.				

Suggested Formative Assessment Rubric

~~LEVEL~~	**EXCEEDS**	**MEETS**	**APPROACHES**	**BELOW**

~~INDICATOR~~	**EXPECTATIONS**	**EXPECTATIONS**	**EXPECTATIONS**	**EXPECTATIONS**
Ability to describe the adaptation of the plant root to its functions	Describes the adaptation of the plant root to its functions most comprehensively	Describes the adaptation of the plant root to its functions	Describes the adaptation of the plant root to its functions less comprehensively	Describes the adaptation of the plant root to its functions with hints
Ability to relate the structure of xylem and phloem to their functions in plants	Relates the structure of xylem and phloem to their functions in plants most precisely	Relates the structure of xylem and phloem to their functions in plants	Relates the structure of xylem and phloem to their functions in plants less precisely	Relates the structure of xylem and phloem to their functions in plants without precision
Ability to describe the absorption of water and uptake of mineral salts in plants	Describes the absorption of water and uptake of mineral salts in plants with in depth details	Describes the absorption of water and uptake of mineral salts in plants	Describes the absorption of water and uptake of mineral salts in plants with minimal details	Describes the absorption of water and uptake of mineral salts in plants without details
Ability to demonstrate the process of transpiration in plants	Demonstrates the process of transpiration in plants accurately and procedurally	Demonstrates the process of transpiration in plants	Demonstrates the process of transpiration in plants omitting some steps	Demonstrates a step in the process of transpiration in plants with hints
Ability to examine the factors affecting the rate of transpiration in plants	Examines the factors affecting the rate of transpiration in plants with in depth details	Examines the factors affecting the rate of transpiration in plants	Examines the factors affecting the rate of transpiration in plants with minimal details	Examines the factors affecting the rate of transpiration in plants without details

Ability to relate the internal structure of the leaf to transpiration in plants	Relates the internal structure of the leaf to transpiration in plants most precisely	Relates the internal structure of the leaf to transpiration in plants	Relates the internal structure of the leaf to transpiration in plants less precisely	Relates the internal structure of the leaf to transpiration in plants without precison
Ability to describe the process of translocation in plants	Describes the process of translocation in plants with in depth details	Describes the process of translocation in plants	Describes the process of translocation in plants with minimal details	Describes the process of translocation in plants without details
Ability to develop lesson learning outcomes for teaching transport in plant for primary school learners	Develops lesson learning outcomes for teaching transport in plant for primary school learners most frequently	Develops lesson learning outcomes for teaching transport in plant for primary school learners	Develops lesson learning outcomes for teaching transport in plant for primary school learners less frequently	Rarely develops lesson learning outcomes for teaching transport in plant for primary school learners

Strand	**Sub Strand**	**Specific Learning Outcomes**	**Suggested Learning Experiences**	**Suggested Key Inquiry Question(s)**
2.0	**2.7**	By the end of the sub	The teacher trainee to:	What is the

Living Things	**Transport in Animals** **(5 lessons)**	strand, the teacher trainee should be able to: a) explain the adaptation of the circulatory system of insects, b) illustrate the structure of the human circulatory system, c) distinguish between single and double circulation systems in animals, d) justify the importance of the ABO blood group system and Rhesus factor in blood transfusion, e) appreciate the importance of maintaining a healthy cardiovascular system, f) explain the links between concepts in Science and Technology and other subjects.	• use digital devices, online resources and other visual aids to observe the circulatory system in insects, • discuss the adaptations of insect circulatory system in insects *(cockroach or locust),* • use digital devices, online resources and other visual aids to observe the structure of the human heart, blood vessels and components of blood, • discuss the functions human heart, blood vessels and blood, • use print and non-print media to search for information on single and double circulation systems, • discuss the difference between single and double circulation systems, • use digital devices and online resources to explore the importance of the ABO blood group system and the Rhesus factor in blood transfusion, • discuss the links between concepts in Science and Technology and other subjects. **Project 1:** Model the human heart to include	relevance of studying the transport system of animals?

			the blood vessel for display in class.	
Core competencies; • **Digital literacy skills** as the teacher trainee uses digital devices and online resources. • **Pedagogical content knowledge** as the teacher trainee prepares, presents and critiques lessons.				
Values: **Unity, respect** and **love** as the teacher trainee works in groups with peers.				

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to explain the adaptation of the circulatory system of insects	Explains the adaptation of the circulatory system of insects with in depth details	Explains the adaptation of the circulatory system of insects	Explains the adaptation of the circulatory system of insects with minimal details	Explains the adaptation of the circulatory system of insects without details
Ability to illustrate the structure of the human circulatory system	Illustrates the structure of the human circulatory system most elaborately	Illustrates the structure of the human circulatory system	Illustrates the structure of the human circulatory system less elaborately	Illustrates the structure of the human circulatory system without elaborating
d Ability to distinguish between single and double circulation systems in	Distinguishes between single and double circulation systems in animals	Distinguishes between single and double circulation systems in animals	Distinguishes between single and double circulation systems in animals	Distinguishes between single and double circulation systems in animals

animals	most precisely		less precisely	without precision
Ability to justify the importance of the ABO blood group system and Rhesus factor in blood transfusion	Justifies the importance of the ABO blood group system and Rhesus factor in blood transfusion with in depth details	Justifies the importance of the ABO blood group system and Rhesus factor in blood transfusion	Justifies the importance of the ABO blood group system and Rhesus factor in blood transfusion with minimal details	Justifies the importance of the ABO blood group system and Rhesus factor in blood transfusion without details
Ability to explain the links between concepts in Science and Technology and other subjects	Explains the links between concepts in Science and Technology and other subjects most elaborately	Explains the links between concepts in Science and Technology and other subjects	Explains the links between concepts in Science and Technology and other subjects less elaborately	Explains the links between concepts in Science and Technology and other subjects without elaborating

Strand	**Sub Strand**	**Specific Learning Outcomes**	**Suggested Learning Experiences**	**Suggested Key Inquiry Question(s)**
2.0 Living	**2.8 Nutrition in Plants and**	By the end of the sub strand, the teacher trainee	The teacher trainee to: • use print or digital media to	Why is the nutrition

things	**Animals** **(5 Hours)**	should be able to: a) distinguish between autotrophism and heterotrophism as types of nutrition, b) describe the process of photosynthesis in plants, c) relate the structure of the human digestive system to its functions, d) describe the process of digestion in human beings, e) describe the problems of digestion in the human, f) appreciate the importance of the human digestive system, g) integrate competency of creativity and imagination in teaching	compare the difference between autotrophism and heterotrophism as types of nutrition, • discuss types of feeding in heterotrophism and make a PowerPoint presentation, • discuss and outline the process of photosynthesis, • discuss the process of digestion, • use print or digital media to observe adaptations of the human digestive system to its functions, • present a lessons on human digestive system and use digital device or other visual aids to peer teach, • use Science and Technology or Environmental Activities curriculum designs to identify where integration of creativity and imagination has been prescribed. Discuss how the competency can be developed,	important?

		and learning nutrition in plants and animals.	**Project 1**: Model the human digestive system and display in class.	
Core Competencies to be developed: ● **Pedagogical Content Knowledge** the teacher trainee discusses and makes presentations on nutrition. ● **Digital literacy skills** as the teacher trainee uses digital devices, online resources and other visual aids to observe and draw the human digestive system.				
Value: Unit**y** as the teacher trainee works together in teams with clearly assigned roles.				

Suggested Formative Assessment Rubric

LEVEL **INDICATOR**	**EXCEEDS EXPECTATIONS**	**MEETS EXPECTATIONS**	**APPROACHES EXPECTATIONS**	**BELOW EXPECTATIONS**
Ability to distinguish between autotrophism and	Distinguishes between autotrophism and	Distinguishes between autotrophism and	Distinguishes between autotrophism and	Distinguishes between autotrophism and

heterotrophism as types of nutrition	heterotrophism as types of nutrition most precisely	heterotrophism as types of nutrition	heterotrophism as types of nutrition less precisely	heterotrophism as types of nutrition without precision
Ability to describe the process of photosynthesis in plants	Describes all the steps in the process of photosynthesis in plants with in depth details	Describes all the steps in the process of photosynthesis in plants	Describes most of the steps in the process of photosynthesis in plants	Describes the process of photosynthesis in plants
Ability to relate the structure of the human digestive system to its functions	Relates the structure of the human digestive system to its functions with in depth details	Relates the structure of the human digestive system to its functions	Relates the structure of the human digestive system to its functions with minimal details	Relates the structure of the human digestive system to its functions without details
Ability to describe the process of digestion in human beings	Describes all the stages of the process of digestion in human beings with in depth details	Describes all the stages of the process of digestion in human beings	Describes most of the stages of the process of digestion in human beings correctly	Describes one stage of the process of digestion in human beings correctly but with hints
Ability to describe the problems of digestion in humans	Describes all the common problems of digestion in humans with in depth details	Describes all the common problems of digestion in humans	Describes most of the common problems of digestion in humans correctly	Describes a few of the common problems of digestion in humans correctly
Ability to integrate competency of creativity and imagination in	Integrates competency of creativity and imagination in	Integrates competency of creativity and imagination in	Integrates competency of creativity and imagination in	Integrates competency of creativity and imagination in

teaching and learning nutrition in plants and animals	teaching and learning nutrition in plants and animals most efficiently	teaching and learning nutrition in plants and animals	teaching and learning nutrition in plants and animals less efficiently	teaching and learning nutrition in plants and animals inefficiently

Strand	**Sub Strand**	**Specific Learning Outcomes**	**Suggested Learning Experiences**	**Suggested Key Inquiry Question(s)**
2.0 Living things	**2.9 Reproduction in Plants**	By the end of the sub strand, the teacher trainee should be able to:	The teacher trainee to: • use specimens, print or digital media to observe the structure of a flower and relate it to its	Why is the study of reproduction in plants relevant?

	(5 Hours)	a) relate the structure of the flower to its functions, b) describe types of pollination in flowering plants, c) investigate features and mechanisms that favour cross pollination in plants, d) describe the agents of pollination in flowering plants, e) describe the processes of fertilization, fruit and seed formation in flowering plants. f) outline the methods of fruit and seed dispersal in plants, g) appreciate the importance of	functions, • use print or digital media to observe pollination and identify cross and self- pollination, • use print or digital media to explore and discuss the advantages of pollination (*cross and self-pollination*), • use print or digital media to explore the adaptive features and mechanisms that favor cross pollination or discourage self-pollination, • discuss agents of pollination in flowering plants, • use print or digital media to find out the characteristics of insect and wind pollinated flowers, • use print or digital media to observe and discuss the processes of fertilization, and fruit and seed formation in flowering plants. Write an essay on this, • use specimens, digital devices, online, resources and other visual aids to observe and discuss methods	

		flowering and non-flowering plants to man and nature, h) mainstream (PCIs) in teaching of reproduction in plants.	of fruit and seed dispersal. Write a report on dispersal, • use flowers to presents a lessons on structure and function of parts of a flower, • show how PCIs can be integrated in learning experiences for learning reproduction in plants.	
Core competencies developed: • **Pedagogical content knowledge** as the teacher trainee prepares and teaches lessons. • **Digital literacy skills** as the teacher trainee use digital devices and online resources.				
Values: • **Respect** as the teacher trainee participate in group work.				

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to relate the structure of the flower to its functions	Relates the structure of the flower to its functions with in depth details	Relates the structure of the flower to its functions	Relates the structure of the flower to its functions with minimal details	Relates the structure of the flower to its functions without details
Ability to describe types of pollination in	Describes all the types of pollination in	Describes types of pollination in	Describes most of the types of pollination in	Describes a few of types of pollination in

flowering plants	flowering plants with in depth details	flowering plants	flowering plants	flowering plants
Ability to investigate features and mechanisms that favour cross pollination in plants	Investigates all features and mechanisms that favour cross pollination in plants with in depth details	Investigates all features and mechanisms that favour cross pollination in plants	Investigates most of the features and mechanisms that favour cross pollination in plants	Investigates few features and mechanisms that favour cross pollination in plants
Ability to describe the agents of pollination in flowering plants	Describes all the agents of pollination in flowering plants with precision	Describes all the agents of pollination in flowering plants	Describes most of the agents of pollination in flowering plants	Describes few of the agents of pollination in flowering plants
Ability to describe the processes of fertilization, fruit and seed formation in flowering plants	Describes all the processes of fertilization, fruit and seed formation in flowering plants with in depth details	Describes all the processes of fertilization, fruit and seed formation in flowering plants	Describes most of the processes of fertilization, fruit and seed formation in flowering plants	Describes few of the processes of fertilization, fruit and seed formation in flowering plants
Ability to outline the methods of fruit and seed dispersal in plants	Outlines all the methods of fruit and seed dispersal in plants with details	Outlines all the methods of fruit and seed dispersal in plants	Outlines most of the methods of fruit and seed dispersal in plants	Outlines a few of the methods of fruit and seed dispersal in plants
Ability to mainstream (PCIs) in teaching of reproduction in plants	Mainstreams (PCIs) in teaching of reproduction in plants most efficiently	Mainstreams (PCIs) in teaching of reproduction in plants	Mainstreams (PCIs) in teaching of reproduction in plants less efficiently	Mainstreams (PCIs) in teaching of reproduction in plants inefficeiently

Strand	Sub strand	Specific learning outcomes	Suggested learning experiences	Suggested Key Inquiry Question(s)
2.0 Living things	**2.10 Reproduction in Humans** **(5 Hours)**	By the end of the sub strand, the teacher trainee should be able to: a) describe the structures of the	The teacher trainee to: • use print or digital media to study and discuss the structure of male and female reproductive systems, • download and watch	Why is reproduction in humans important?

		male and female reproductive systems in human beings, b) illustrate the processes of fertilization, implantation, gestation and birth in human beings, c) describe the menstrual cycle in human beings, d) describe sexually transmitted infections in human beings, e) appreciate the importance of responsible sexual behaviour, f) integrate the competency of self- efficacy in the learning of reproduction in	animations that illustrate the processes of fertilization, implantation, gestation and birth, • discuss the secondary sexual characteristics in human beings, • use print or digital media to discuss the stages in the menstrual cycle (menstrual phase, follicular, ovulation and luteal), • carry out a library search for disorders of the menstrual cycle such as Abnormal uterine bleeding, Menorrhagia, Amenorrhea, Oligomenorrhea, Fibroids and Premenstrual syndrome (PMS), • use print or digital media to discuss the causes, signs, symptoms and prevention of common sexually transmitted infections such as (Chlamydia, Gonorrhea, Genital herpes, Hepatitis, Human Papillomavirus (HPV), Syphilis,	

		animals.	Trichomoniasis and HIV and Aids), • develop the competency of self-efficacy in the learning of reproduction in animals.	
Core competencies developed: ● **Pedagogical content knowledge** as the teacher trainee selects content and prepares lessons on reproduction. ● **Digital literacy skills** as the teacher trainee uses digital devices and online resources.				
Values: Unity as the teacher trainee participates in in group work.				

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	**EXCEEDS EXPECTATIONS**	**MEETS EXPECTATIONS**	**APPROACHES EXPECTATIONS**	**BELOW EXPECTATIONS**
Ability to describe the structures of the male and female reproductive systems in human	Describes all the structures of the male and female reproductive systems in human beings with	Describes all the structures of the male and female reproductive systems in human beings	Describes most of the structures of the male and female reproductive systems in human beings	Describes some of the structures of the male and female reproductive systems in human beings

beings	in depth details			
Ability to illustrate the processes of fertilization, implantation, gestation and birth in human beings	Illustrates all the processes of fertilization, implantation, gestation and birth in human beings with details	Illustrates all the processes of fertilization, implantation, gestation and birth in human beings	Illustrates most of the processes of fertilization, implantation, gestation and birth in human beings	Illustrates few of the processes of fertilization, implantation, gestation and birth in human beings
Ability to describe the menstrual cycle in human beings	Describes the menstrual cycle in human beings most precisely	Describes the menstrual cycle in human beings	Describes the menstrual cycle in human beings less precisely	Describes the menstrual cycle in human beings without precision
Ability to describe sexually transmitted infections in human beings	Describes all common sexually transmitted infections in human beings	Describes all common sexually transmitted infections in human beings	Describes most of common sexually transmitted infections in human beings	Describes a few of common sexually transmitted infections in human beings
Ability to integrate the competency of self- efficacy in the learning of reproduction in animals	Integrates the competency of self-efficacy in the learning of reproduction in animals most efficiently	Integrates the competency of self-efficacy in the learning of reproduction in animals	Integrates the competency of self-efficacy in the learning of reproduction in animals less efficiently	Integrates the competency of self-efficacy in the learning of reproduction in animals inefficiently

STRAND 3.0 MATTER

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
3.0 Matter	**3.1 Properties of matter** (6 Hours)	By the end of the sub strand the teacher trainee should be able to: a) describe the	Teacher trainee to: • brainstorm on the characteristics of various states of matter and report, • discuss the particulate nature of matter, • carry out activities to demonstrate the	1. How does temperature affect matter? 2. How can components

		particulate nature of matter, b) investigate the effect of heating and cooling on states of matter, c) illustrate the heating and cooling curves of matter, d) apply the concept of change of state of matter in life, e) examine types of mixtures in day-to-day life, f) evaluate the use of methods of separating mixtures in day-to-day life, g) investigate causes and prevention of water pollution in the environment, h) describe how water can be made safe for use in day	effect of heating and cooling on states of matter, (*observe safety when heating and cooling substances*) • carry out experiments to demonstrate heating and cooling curves of matter, • discuss features of the heating and cooling curves of matter, • discuss the change of states of matter in the water cycle, • carry out activities to demonstrate the effect of latent heat in everyday life, • discuss various applications of change of states of matter in everyday life *(drying grain, drying clothes, cooling water),* • use digital devices and online resources to study the water cycle, • identify different types of mixtures in day-to-day life, • carry out activities to separate various types of mixtures and outline the methods of separation, • discuss with pears the causes and mitigation measures of water pollution, • carry out activities to demonstrate how water can be made safe for use in day to	of mixtures be separated?

		to day life, i) formulate key inquiry questions in teaching of matter for Pre-primary and primary learners.	day life, • prepare and present an activity lesson on change of states of matter, • develop suggested key inquiry questions for teaching properties of matter for learners in primary level.	

Core competencies to be developed:

- **Pedagogical content knowledge** as the teacher trainee develops suggested key inquiry questions for teaching properties of matter for learners in primary level.
- **Assessment competency** as the teacher trainee critiques peer lessons.
- **Self-Efficacy** as the teacher trainee presents the lesson.

Value:

- **Peace** as the teacher trainee studies together with peers.
- **Responsibility** as the teacher trainee carries out activities to demonstrate the effect of latent heat in everyday life.

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to describe the particulate nature of matter	Describes the particulate nature of matter with in depth details	Describes the particulate nature of matter	Describes the particulate nature of matter with minimal details	Describes the particulate nature of matter without details
Ability to investigate the effect of heating and cooling on states of matter with relevant	Investigates the effect of heating and cooling on states of matter with all the relevant	Investigates the effect of heating and cooling on states of matter with all the relevant	Investigates the effect of heating and cooling on states of matter with some relevant examples	Investigates the effect of heating and cooling on states of matter without relevant

examples	examples well illustrated	examples		examples
Ability to illustrate the heating and cooling curves of given substances (matter)	Illustrates the heating and cooling curves of all the given substances (matter) with details	Illustrates the heating and cooling curves of matter all the given substances (matter)	Illustrates the heating and cooling curves of most of the given substances (matter)	Illustrates the heating and cooling curves of few of the given substances (matter)
Ability to apply the concept of change of state of matter in life	Applies the concept of change of state of matter in life most effectively	Applies the concept of change of state of matter in life	Applies the concept of change of state of matter in life less effectively	Applies the concept of change of state of matter in life without effectiveness
Ability to examine common types of mixtures in day-to-day life	Examines all the common types of mixtures in day-to-day life with in depth details	Examines all types of mixtures in day-to-day life	Examines most of the types of mixtures in day-to-day life	Examines some of the types of mixtures in day-to-day life
Ability to evaluate the use of methods of separating mixtures in day-to-day life	Evaluates the use of methods of separating mixtures in day-to-day life most precisely	Evaluates the use of methods of separating mixtures in day-to-day life	Evaluates the use of methods of separating mixtures in day-to-day life less precisely	Evaluates the use of methods of separating mixtures in day-to-day life without precision
Ability to investigate causes and prevention of water pollution in the environment	Investigates all the causes and prevention of water pollution in the environment most effectively	Investigates all the causes and prevention of water pollution in the environment	Investigates most of the causes and prevention of water pollution in the environment less effectively	Investigates a few of the causes and prevention of water pollution in the environment without effectiveness
Ability to describe how	Describes how water	Describes how water	Describes how water	Describes how water

water can be made safe for use in day to day life	can be made safe for use in day to day life with in depth details	can be made safe for use in day to day life	can be made safe for use in day to day life with minimal details	can be made safe for use in day to day life without details
Ability to formulate key inquiry questions in teaching of matter for Pre-primary and primary learners	Formulates key inquiry questions in teaching of matter for Pre-primary and primary learners most effectively	Formulates key inquiry questions in teaching of matter for Pre-primary and primary learners	Formulates key inquiry questions in teaching of matter for Pre-primary and primary learners less effectively	Formulates key inquiry questions in teaching of matter for Pre-primary and primary learners without effectiveness

Strand	**Sub Strand**	**Specific Learning Outcomes**	**Suggested Learning Experiences**	**Suggested Key Inquiry Question(s)**
3.0 Matter	**3.2 Air** **(6 Hours)**	By the end of the sub strand, the teacher trainee should be able to: a) determine the composition of air in the atmosphere, b) describe fractional distillation of liquid air as used in separating the components of air, c) investigate properties of gases in the atmosphere, d) explain the uses of	The teacher trainee to: ● discuss the components of air in the atmosphere, ● access and use online resources to investigate the composition of air, ● carry out activity to estimate the proportion of oxygen in air in the atmosphere *(burning candle)*, ● use digital devices to observe and describe the process of fractional distillation of liquid air, ● discuss uses of different components of air, ● carry out experiments to investigate properties of gases in the atmosphere	How are the components of air important in everyday life?

		components of air in the atmosphere, e) describe the formation and effect of acid rain on the environment, f) appreciate the importance of the components of air in life, g) appreciate the importance of integrating pertinent and contemporary issues in the teaching of science for learners at primary school level.	*(Oxygen and Carbon(IV) oxide),* ● search for information from print and non-print media on the properties of Nitrogen and inert/noble/rare gases in the atmosphere, ● discuss the greenhouse effect in the atmosphere, ● carry out activities to show that oxygen is the active part of air *(combustion, breathing, rusting, and germination),* ● search for information on the formation and effect of acid rain on the environment and present in plenary, ● plan and present a lesson to demonstrate the uses of oxygen and critique the lessons presented by peers, ● discuss the pertinent and contemporary issues related to air and air quality.	

Core Competencies to be developed:

- **Pedagogical content knowledge** as the teacher trainee participates in class discussion, activities and lesson presentation.
- **Critical thinking and problem solving** as the teacher trainee discusses with peers the pertinent and contemporary issues related to air and air quality

Value:

Social justice as the teacher trainee shares available resources to search for information on air.

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to determine the composition of air in the atmosphere	Determines all the composition of air in the atmosphere with details	Determines all the composition of air in the atmosphere	Determines most of the composition of air in the atmosphere	Determines few of the composition of air in the atmosphere
Ability to describe fractional distillation of liquid air as used in separating the components of air	Describes every step in fractional distillation of liquid air as used in separating the components of air with in depth details	Describes every step in fractional distillation of liquid air as used in separating the components of air	Describes part of the steps in fractional distillation of liquid air as used in separating the components of air	Describes part of the step in fractional distillation of liquid air as used in separating the components of air with hints
Ability to investigate properties of gases in the atmosphere	Investigates the properties of all gases in the atmosphere with in depth details	Investigates the properties of all gases in the atmosphere	Investigates properties of most of the gases in the atmosphere	Investigates properties of a few gases in the atmosphere with hints
Ability to explain the uses of components of air in the atmosphere	Explains all the uses of components of air in the atmosphere with details	Explains all the uses of components of air in the atmosphere	Explains most of the uses of components of air in the atmosphere	Explains one of the uses of components of air in the atmosphere

Ability to describe the formation and effect of acid rain on the environment	Describes the formation and effect of acid rain on the environment with in depth details	Describes the formation and effect of acid rain on the environment	Describes the formation and effect of acid rain on the environment with minimal details	Describes the formation and effect of acid rain on the environment without details

STRAND 4.0 FORCE AND ENERGY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Force and Energy	**4.1 Force and Gravity** **(5 Hours)**	By the end of the sub strand, the teacher trainee should be able to: a) explain force as used in science, b) demonstrate the effects of force on objects, c) explain gravity as a force in nature, d) demonstrate effects of gravity on falling objects, e) distinguish between mass and weight as used in science, f) appreciate the importance of gravity in day to day life, g) develop a lesson on force and gravity for online learning.	The teacher trainee to: • use print or non-print to search for the meaning of meaning of force as used in science, • use real objects, digital devices and other visual aids to observe and demonstrate the effects of force on objects, • brainstorm on the meaning of gravity as used in science, • carry out activities to demonstrate gravitational force, • investigate the relationship between mass and weight as used in science *(Weight = Mass x gravity),* • present a practical lesson on the effect of gravity on falling objects to online learners.	How does gravitational force affect objects in nature?

Core competencies to be developed:

- **Learning to learn and reflective practice** as the teacher trainee participates in class discussion and demonstrates

the effect of gravity on objects in nature. • **Digital literacy skills** as the teacher trainee uses digital devices and other visual aids to observe and demonstrate the effects of force on objects.
Value: • **Unity, Responsibility** and **Respect** as the teacher trainee works in groups. • **Integrity** as the teacher trainee generates own data.

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to explain force as used in science	Explains force as used in science most precisely	Explains force as used in science	Explains force as used in science less precisely	Explains force as used in science without precision
Ability to demonstrate the effects of force on objects	Demonstrates all the effects of force on objects with details	Demonstrates all the effects of force on objects	Demonstrates most of the effects of force on objects correctly	Demonstrates few of the effects of force on objects correctly
Ability to explain gravity as a force in nature	Explains gravity as a force in nature most precisely	Explains gravity as a force in nature	Explains gravity as a force in nature less precisely	Explains gravity as a force in nature without precision
Ability to demonstrate effects of gravity on falling objects	Demonstrates effects of gravity on falling objects with in depth details	Demonstrates effects of gravity on falling objects	Demonstrates effects of gravity on falling objects with minimal details	Demonstrates effects of gravity on falling objects without details

Ability to distinguish between mass and weight as used in science	Distinguishes between mass and weight as used in science most precisely	Distinguishes between mass and weight as used in science	Distinguishes between mass and weight as used in science less precisely	Distinguishes between mass and weight as used in science without precision

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Force and Energy	**4.2 Friction** **(5 Hours)**	By the end of the sub strand, the teacher trainee should be able to: a) explain friction as a type of force, b) identify advantages and disadvantages of friction as a type of force, c) demonstrate ways of increasing and reducing friction between surfaces, d) facilitate a practical lesson on ways of increasing and reducing friction, e) evaluate the economic importance of friction in life, f) appreciate applications	The teacher trainee to: ● carry out activities to measure friction on a smooth and a rough surface to derive the meaning of friction as a type of force, ● use, digital devices and other visual aids to identify advantages and disadvantages of friction as a type of force, ● carry out activities to demonstrate ways of increasing and reducing friction on surfaces, ● discuss the economic importance of friction in day to day life, ● present a practical lesson on ways of increasing and reducing friction as they peer critique the lessons, ● use digital media to observe applications of friction in day to day life, ● discuss the applications of friction	Why should friction force be controlled?

		of friction in day to day life.	force in in the community.	

Core Competencies to be developed:

- **Digital literacy skills** as the teacher trainee uses digital media to observe applications of friction in day to day life.
- **Communication and collaboration** as the teacher trainee works with peers in groups to discuss applications of friction force in in the community.

Value:

Social Justice and **Unity** as the teacher trainee share roles the activities to demonstrate ways of increasing and reducing friction on surfaces.

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to explain friction as a type of force	Explains friction as a type of force most elaborately	Explains friction as a type of force	Explains friction as a type of force less elaborately	Explains friction as a type of force without elaborating
Ability to identify advantages and disadvantages of friction as a type of force	Identifies all the advantages and disadvantages of friction as a type of force with details	Identifies all the advantages and disadvantages of friction as a type of force	Identifies most of the advantages and disadvantages of friction as a type of force	Identifies a few of the advantages and disadvantages of friction as a type of force
Ability to demonstrate ways of increasing and	Demonstrates all the ways of increasing and reducing friction	Demonstrates all the ways of increasing and reducing friction	Demonstrates most of the ways of increasing and	Demonstrates few of ways of increasing and reducing friction

reducing friction between surfaces	between surfaces with details	between surfaces	reducing friction between surfaces	between surfaces
Ability to facilitate a practical lesson on ways of increasing and reducing friction	Facilitates a practical lesson on ways of increasing and reducing friction most effectively	Facilitates a practical lesson on ways of increasing and reducing friction	Facilitates a practical lesson on ways of increasing and reducing friction less effectively	Facilitates a practical lesson on ways of increasing and reducing friction without effectiveness
Ability to evaluate the economic importance of friction in life	Evaluates all the economic importance of friction in life with details	Evaluates all the economic importance of friction in life	Evaluates most of the economic importance of friction in life correctly	Evaluates few of the economic importance of friction in life correctly

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
4.0 Force and Energy	**4.3 Up-thrust, Cohesion and adhesion** **(5 Hours)**	By the end of the sub strand, the teacher trainee should be able to: a) demonstrate the up thrust, cohesive and adhesive as types of force, b) determine factors that affect floating and sinking of objects in water, c) present a practical lesson to demonstrate floating and sinking, d) distinguish between cohesion and adhesion as types of	The teacher trainee to: ● use print and non-print media to search for the meaning of up thrust, cohesive and adhesive forces, ● carry out activities to demonstrate up thrust, cohesive and adhesive forces, ● carry out activities to investigate the effect of shape and type of material on floating and sinking, ● carry out activities to illustrate cohesion and adhesion as types of force, ● discuss the differences between adhesion and cohesion forces, ● discuss the applications of	1. How does up thrust affect objects? 2. Why are adhesion and cohesion important as forces?

		force, e) describe the applications of adhesion and cohesion forces in everyday life, f) appreciate the applications of floating and sinking of objects in everyday life.	adhesion and cohesion forces in everyday life, ● construct rafts or floaters using locally available materials, ● present and critiques a practical lesson to demonstrate floating and sinking, ● use digital devices and online resources to access animations and illustrations on applications of up thrust, adhesion and cohesion forces in day to day life.	

Core Competencies to be developed:

- **Pedagogical content knowledge** as teacher trainee presents and critiques micro-lessons.
- **Assessment competency** as the teacher training peer reviews on their lessons.
- **Self-Efficacy** as the teacher trainee prepares and presents practical lesson on friction.

Value:

- **Peace** and **Respect** as the teacher trainee carry out different roles and duties while carrying out activities to investigate the effect of shape and type of material on floating and sinking.
- **Integrity** as the teacher trainee generates and uses their own data while carrying out activities to investigate the effect of shape and type of material on floating and sinking.

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to demonstrate the up thrust, cohesive and adhesive as types of force	Demonstrates the up thrust, cohesive and adhesive as types of force with in depth details	Demonstrates the up thrust, cohesive and adhesive as types of force	Demonstrates the up thrust, cohesive and adhesive as types of force with minimal details	Demonstrates the up thrust, cohesive and adhesive as types of force without details
Ability to determine factors that affect floating and sinking of objects in water	Determines all the factors that affect floating and sinking of objects in water with relevant examples	Determines all the factors that affect floating and sinking of objects in water	Determines most of the factors that affect floating and sinking of objects in water	Determines few of the factors that affect floating and sinking of objects in water
Ability to present a practical lesson to demonstrate floating and sinking	Presents a practical lesson to demonstrate floating and sinking most effectively	Presents a practical lesson to demonstrate floating and sinking	Presents a practical lesson to demonstrate floating and sinking less effectively	Presents a practical lesson to demonstrate floating and sinking without effectiveness
Ability to distinguish between cohesion	Distinguishes between cohesion and	Distinguishes between cohesion and	Distinguishes between cohesion and	Distinguishes between cohesion and

and adhesion as types of force	adhesion as types of force with in depth details	adhesion as types of force	adhesion as types of force with minimal details	adhesion as types of force without details
Ability to describe the applications of adhesion and cohesion forces in everyday life	Describes the applications of adhesion and cohesion forces in everyday life with in depth details	Describes the applications of adhesion and cohesion forces in everyday life	Describes the applications of adhesion and cohesion forces in everyday life with minimal details	Describes the applications of adhesion and cohesion forces in everyday life without details

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Question(s)
4.0 Force and Energy	**4.4 Energy** (5 Hours) .	By the end of the sub strand, the teacher trainee should be able to: a) identify forms of energy in nature, b) distinguish between temperature and heat in science, c) describe thermal expansion in solids, liquids and gases, d) explain the effects and applications of thermal expansion on matter, e) design	The teacher trainee: ● use print or non-print media to identify different forms of energy (*limited to heat, light and sound*), ● discuss the differences between temperature and heat, ● carry out activities using a to measure and record temperatures, ● carry out activities to demonstrate thermal expansion in solids, liquids and gases, ● discuss the effects and applications of thermal expansion of matter, ● discuss economic importance of thermal expansion of matter, ● carry out activities to demonstrate modes of heat transfer (*conduction, convection and radiation*), ● use digital devices and other objects to observe the applications of heat	Why is heat energy necessary in day to day life?

		experiments to demonstrate modes of heat transfer in different media and in a vacuum, f) prepare and present a lessons on different forms of energy, g) appreciate economic importance of thermal expansion of matter in life.	transfer, ● prepare, present and critique a lesson on different forms of energy, thermal expansion and heat transfer, ● use digital devices and online resources to access animations and illustrations on different forms of energy, thermal expansion and heat transfer. **Project 1**: Make oven gloves and fireless cooker.	
Core Competencies to be developed: • **Pedagogical content knowledge** as the teacher trainee prepares, presents and peer critiques micro lessons in groups. • **Assessment competency** as the teacher trainee prepares assessment rubrics for the lessons. • **Self-Efficacy** as the teacher trainee presents and peer critiques lessons**.**				
Value: • **Respect** and **Integrity** as the teacher trainee works in groups, generate and use their own data on heat energy. • **Love** and **Responsibility** as the teacher trainee cares for fragile apparatus and cares for peers by appropriately using apparatus to avoid injury to self and others.				

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to identify forms of energy in nature	Identifies all forms of energy in nature with details	Identifies all forms of energy in nature	Identifies most of the forms of energy in nature	Identifies few of the forms of energy in nature
Ability to distinguish between temperature and heat in science	Distinguishes between temperature and heat in science most precisely	Distinguishes between temperature and heat in science	Distinguishes between temperature and heat in science less precisely	Distinguishes between temperature and heat in science without precisions
Ability to describe thermal expansion in solids, liquids and gases	Describes thermal expansion in solids, liquids and gases with in depth details	Describes thermal expansion in solids, liquids and gases	Describes thermal expansion in solids, liquids and gases with minimal details	Describes thermal expansion in solids, liquids and gases without details
Ability to explain the effects and applications of thermal expansion on matter	Explains all the effects and applications of thermal expansion on matter with most relevant examples	Explains all the effects and applications of thermal expansion on matter	Explains most of the effects and applications of thermal expansion on matter	Explains few of the effects and applications of thermal expansion on matter
Ability to design experiments to	Designs experiments to demonstrate modes	Designs experiments to demonstrate modes	Designs experiments to demonstrate modes	Designs experiments to demonstrate modes

demonstrate modes of heat transfer in different media and in a vacuum	of heat transfer in different media and in a vacuum most efficiently	of heat transfer in different media and in a vacuum	of heat transfer in different media and in a vacuum less efficiently	of heat transfer in different media and in a vacuum without efficiency
Ability to prepare and present a lesson on different forms of energy	Prepares and presents a lesson on different forms of energy always and most effectively	Prepares and presents a lesson on different forms of energy	Prepares and presents a lesson on different forms of energy occasionally	Prepares and presents a lesson on different forms of energy rarely

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Question(s)
4.0 Force and Energy	**4.5 Light Energy** **(5 Hours)**	By the end of the sub strand, the teacher trainee should be able to: a) describe sources of light in the immediate environment, b) conduct an experiment on rectilinear propagation of light, c) classify materials into transparent, translucent and opaque, d) illustrate the formation of shadows and eclipses in nature,	The teacher trainee to: • use print and online resources to search information on different sources of light • use print and online resources to access animations and illustrations on propagation of light • carry out experiments to demonstrate that light travels in a straight line • use a source of light to test and categorise materials as either transparent, translucent or opaque, • use models and digital resources to demonstrate formation of shadows and eclipses, • discuss the formation of different types of eclipses, • use opaque objects and source of light to illustrate formation of different phases of the moon,	Why is light important in our daily life?

		e) describe the formation of phases of the moon in the lunar cycle, f) perform experiments to verify the laws of reflection of light on plane surfaces, g) illustrate the characteristics of images formed by a plane mirror, h) explain the applications of reflection of light on plane surfaces in everyday life, i) conduct experiments on refraction of light, j) appreciate applications of light, k) prepare schemes of work and lesson	• carry out experiments to verify the laws of reflection of light on a plane surface, • carry out experiments to observe and identify the characteristics of images formed by the plane mirror, • use print and online resources to access animations and illustrations on characteristics of images formed by plane mirrors, • brainstorm on the applications of reflection of light on plane surfaces in everyday life, • use objects and online resources to demonstrate applications of refraction of light in day to day life, • illustrate the applications of reflection of light (to include periscope and kaleidoscope) • design and carry out activities to illustrate refraction of light, • use objects and online resources to illustrate the applications of refraction of light in day to day life, • discuss applications of light in income generating activities,	

		plans on light energy in Science.	• generate schemes of work and lesson plans based on the strand of Energy in the Science and Technology Curriculum Designs **Project 1**. Make a kaleidoscope and periscope. **Project 2**. Make a screen for projecting still images.	
Core Competencies to be developed: **Pedagogical content knowledge** as the teacher trainee carries out a practical lesson on propagation, reflection and refraction of light. **Learning to learn and reflective practice** as the teacher trainee makes a kaleidoscope and/or screen for projecting still images for facilitating learning of scientific concepts involving light energy.				
Value: **Responsibility** and **Respect** as the teacher trainee works with peers in groups when carrying out activities.				

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to describe sources of light in the immediate environment	Describes all sources of light in the immediate environment with details	Describes all sources of light in the immediate environment	Describes most of the sources of light in the immediate environment	Describes one of the sources of light in the immediate environment

Ability to conduct an experiment on rectilinear propagation of light	Conducts an experiment on rectilinear propagation of light most effectively	Conducts an experiment on rectilinear propagation of light	Conducts an experiment on rectilinear propagation of light less effectively	Conducts an experiment on rectilinear propagation of light ineffectively
Ability to classify given materials into transparent, translucent and opaque	Classifies all given materials into transparent, translucent and opaque with details	Classifies all given materials into transparent, translucent and opaque	Classifies most of the given materials into transparent, translucent and opaque	Classifies a few of the given materials into transparent, translucent and opaque with hints
Ability to illustrate the formation of shadows and eclipses in nature	Illustrates the formation of shadows and eclipses in nature most effectively	Illustrates the formation of shadows and eclipses in nature	Illustrates the formation of shadows and eclipses in nature less effectively	Illustrates the formation of shadows and eclipses in nature ineffectively
Ability to describe the formation of phases of the moon in the lunar cycle	Describes the formation of all phases of the moon in the lunar cycle with details	Describes the formation of all phases of the moon in the lunar cycle	Describes the formation of two phases of the moon in the lunar cycle	Describes the formation of one phase of the moon in the lunar cycle
Ability to perform experiments to verify the laws of reflection of light on plane surfaces	Performs experiments to verify the laws of reflection of light on plane surfaces most effectively	Performs experiments to verify the laws of reflection of light on plane surfaces	Performs experiments to verify the laws of reflection of light on plane surfaces less effectively	Performs experiments to verify the laws of reflection of light on plane surfaces ineffectively
Ability to illustrate the characteristics of	Illustrates all the characteristics of	Illustrates all the characteristics of	Illustrates most of the characteristics of	Illustrates a few of the characteristics of

images formed by a plane mirror	images formed by a plane mirror with details	images formed by a plane mirror	images formed by a plane mirror	images formed by a plane mirror
Ability to explain the applications of reflection of light on plane surfaces in everyday life	Explains all the applications of reflection of light on plane surfaces in everyday life with details	Explains all the applications of reflection of light on plane surfaces in everyday life	Explains most of the applications of reflection of light on plane surfaces in everyday life	Explains few of the applications of reflection of light on plane surfaces in everyday life
Ability to conduct experiments on refraction of light	Conducts experiments on refraction of light most effectively	Conducts experiments on refraction of light	Conducts experiments on refraction of light less effectively	Conducts experiments on refraction of light ineffectively
Ability to prepare schemes of work and lesson plans on light energy in science	Prepares schemes of work and lesson plans on light energy in science accurately and timely	Prepares schemes of work and lesson plans on light energy in science accurately	Prepares schemes of work and lesson plans on light energy in science less accurately	Prepares schemes of work and lesson plans on light energy in science with no accuracy

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Force and Energy	**4.6 Sound Energy** **(5 Hours)**	By the end of the sub-strand, the teacher trainee should be able to: a) identify the sources of sounds in the immediate environment, b) conduct experiment to demonstrate that sound is produced by vibrating objects, c) conduct experiments to demonstrate that sound requires material medium for propagation,	The teacher trainee to: • brainstorm on the various sources of sound in the environment, • use print or online resources to search for information on different sources of sound, • carry out activities to demonstrate that sound is produced by vibrating objects (*Hitting, plucking and blowing*), • carry out experiments to demonstrate that sound requires a material medium for propagation, • use print and online resources to search for information on the nature of sound waves, • demonstrate movement of sound waves in nature, • play different musical instruments to produce sounds of different qualities such as soft, loud and sharp,	Why is sound important?

		d) illustrate the nature of sound waves in life, e) perform experiments to show variations in volume and pitch of sound, f) demonstrate how echoes are formed from sound waves in the environment, g) demonstrate the application of echoes in nature, h) design authentic assessment tasks for sound energy in Science and Technology.	• carry out activities to demonstrate volume and pitch of sound, • use digital devices and online resources to access animations and illustrations on the nature of sound, echo formation, sound pollution and how to minimize them in the environment, • carryout activities with peers to demonstrate formation of echoes and how to minimize them in the environment, • use digital devices and online resources to show applications of echoes, • discuss the causes and effects of sound pollution and measures to use against the pollution • discuss economic importance of echoes in day to day life, • develop authentic assessment tasks on the strand on Sound in Science and Technology Curriculum Designs • **Project 1:** Make sound cones, sound amplifiers and ear muffs.	

Core Competencies to be developed: • **Pedagogical content knowledge** as teacher trainees make choices of materials for the practical lesson and carry out the lesson on sound energy. • **Assessment competency** as teacher trainees critique peer lessons and assessment rubrics. • **Self-Efficacy** as the teacher trainee presents own lessons for peer assessment.
Value: • **Unity** and **Respect** as the teacher trainee works with peers. • **Responsibility** as the teacher trainee takes precautions from loud sound.

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to identify the sources of sounds in the immediate environment	Identifies all the sources of sounds in the immediate environment with details	Identifies all the sources of sounds in the immediate environment	Identifies most of the sources of sounds in the immediate environment	Identifies one of the sources of sounds in the immediate environment
Ability to conduct experiment to demonstrate that sound is produced by vibrating objects	Conducts experiment to demonstrate that sound is produced by vibrating objects most effectively	Conducts experiment to demonstrate that sound is produced by vibrating objects	Conducts experiment to demonstrate that sound is produced by vibrating objects less effectively	Conducts experiment to demonstrate that sound is produced by vibrating objects ineffectively
Ability to conduct	Conducts	Conducts	Conducts	Conducts

experiments to demonstrate that sound requires material medium for propagation	experiments to demonstrate that sound requires material medium for propagation most effectively	experiments to demonstrate that sound requires material medium for propagation	experiments to demonstrate that sound requires material medium for propagation less effectively	experiments to demonstrate that sound requires material medium for propagation ineffectively
Ability to illustrate the nature of sound waves in life	Illustrates the nature of sound waves in life with in depth details	Illustrates the nature of sound waves in life	Illustrates the nature of sound waves in life with minimal details	Illustrates the nature of sound waves in life without details
Ability to perform experiments to show variations in volume and pitch of sound	Performs experiments to show variations in volume and pitch of sound most effectively	Performs experiments to show variations in volume and pitch of sound	Performs experiments to show variations in volume and pitch of sound less effectively	Performs experiments to show variations in volume and pitch of sound ineffectively
Ability to demonstrate how echoes are formed from sound waves in the environment	Demonstrates how echoes are formed from sound waves in the environment most precisely	Demonstrates how echoes are formed from sound waves in the environment	Demonstrates how echoes are formed from sound waves in the environment less precisely	Demonstrates how echoes are formed from sound waves in the environment without precision
Ability to demonstrate the application of echoes in nature	Demonstrates the application of echoes in nature most precisely	Demonstrates the application of echoes in nature	Demonstrates the application of echoes in nature less precisely	Demonstrates the application of echoes in nature without precision
Ability to design	Designs authentic	Designs authentic	Designs authentic	Designs authentic

authentic assessment tasks for sound energy in Science	assessment tasks for sound energy in Science accurately and timely	assessment tasks for sound energy in Science accurately	assessment tasks for sound energy in Science less accurately	assessment tasks for sound energy in Science without accuracy

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
4.0 Force and Energy	**4.7 Renewable and Non-renewable Energy** (5 Hours)	By the end of the sub strand, the teacher trainee should be able to: a) distinguish between renewable and non-renewable sources of energy in the environment, b) describe methods of conserving energy in day to day life, c) describe the importance of using renewable sources of energy in the environment, d) facilitate a lesson on renewable and non-renewable source of	The teacher trainee: • discuss the sources of energy (*renewable and non –renewable sources of energy*) • explore methods of conserving energy (*Note: calculation on law of conservation of energy not required*). • search for information on the importance of renewable sources of energy, • discuss economic impact of using renewable sources of energy, • discuss ways of conserving energy in the society, • use digital devices to retrieve appropriate video to use in a lesson on conservation of energy, • peer critique the lessons on	1. Why do we need renewable sources of energy? 2. How is energy conserved in society?

		energy, e) Appreciate the economic importance of renewable sources of energy in everyday life, f) design tools for use for assessment in Science and Technology for learners, g) appreciate the importance of conserving energy in the environment.	renewable and non-renewable • carry out activities to develop assessment tools for use in assessing learning in the strand of Energy in Grade 6 Science and Technology • Model a lesson using science and Technology curriculum design and implement **Project on:** • Utilization of technology to increase production of energy • Ways of conserving energy using appropriate technology **Project:** design and disseminate captivating messages on energy conservation to create awareness for immediate community concerning energy conservation	
Core Competencies to be developed: • **Citizenship and leadership** as the teacher trainee carries out project on designing and disseminating captivating messages on energy conservation to create awareness. • **Creativity and innovation** as the teacher trainee carries out a project on ways of conserving energy using appropriate technology.				
Value: • **Patriotism** as the teacher trainee advocates for planting of more trees and minimizing cutting of trees as an energy				

conservation method.

- **Responsibility** as the teacher trainee conserves energy in the environment.

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to distinguish between renewable and non-renewable sources of energy in the environment	Distinguishes between renewable and non-renewable sources of energy in the environment with in depth details	Distinguishes between renewable and non-renewable sources of energy in the environment	Distinguishes between renewable and non-renewable sources of energy in the environment with minimal details	Distinguishes between renewable and non-renewable sources of energy in the environment without details
Ability to describe methods of conserving energy in day to day life	Describes all the methods of conserving energy in day to day life with details	Describes all the methods of conserving energy in day to day life	Describes most of the methods of conserving energy in day to day life	Describes few method of conserving energy in day to day life
Ability to describe the importance of using renewable sources of energy in the environment	Describes the importance of using renewable sources of energy in the environment with in depth details	Describes the importance of using renewable sources of energy in the environment	Describes the importance of using renewable sources of energy in the environment with minimal details	Describes the importance of using renewable sources of energy in the environment without details
Ability to facilitate a lesson on renewable	Facilitates a lesson on renewable and non-	Facilitates a lesson on renewable and non-	Facilitates a lesson on renewable and non-	Facilitates a lesson on renewable and non-

and non-renewable source of energy	renewable source of energy most effectively	renewable source of energy	renewable source of energy less effectively	renewable source of energy ineffectively
Ability to design tools for use for assessment in Science and Technology for learners	Designs all appropriate tools for use for assessment in Science and Technology for learners accurately	Designs all given tools for use for assessment in Science and Technology for learners accurately	Designs most of the tools for use for assessment in Science and Technology for learners accurately	Designs a few of the tools for use for assessment in Science and Technology for learners accurately

Strand	**Sub Strand**	**Specific Learning**	**Suggested Learning Experiences**	**Suggested Key**

		Outcomes		Inquiry Question(s)
5.0 Work, Power and Machines	**5.1 Machines, Work and Power** **(6 Hours)**	By the end of the sub-strand, the teacher trainee should be able to: a) explain work, power and energy as used in science. b) relate work, power and energy as used in science c) determine mechanical advantage, velocity ratio and efficiency of simple machines, d) demonstrate the turning effect of force about a point (moment), e) demonstrate the principle of moments of force of a lever, f) compare classes of	The teacher trainee to: • use print or online resources to search for information on the meaning of work and power and energy. • carry out calculations on work and power, *(Note: work done by a resolved force not required)* • carry out activities to determine the mechanical advantage, velocity ratio and efficiency of simple machines (levers, inclined planes, gears, rollers, wheel and axles and pulleys), • carry out activities to show the turning effect of force about a point (moment), • carry out activities to determine the principle of moments of force of a lever (***Hint: resolved forces not required***), • carry out activities to classify levers,	1. How do simple machines make work easier? 2. What is the economic importance of using simple machine? 3. How are levers classified?

		levers used in daily life, g) demonstrate applications of simple machines in daily life, h) appreciate the economic importance of simple machines in day to day life, i) select suitable non formal activities for teaching and learning of science, j) design tools for reporting on learner performance in scientific concepts.	• carry out activities to show the applications of simple machines in daily life, • discuss the economic importance of simple machines, • use digital devices and online resources to access animations and videos on simple machines, • discuss non-formal activities that can be used in the teaching of science and technology • simulate a non-formal activity for teaching and learning about simple machines • carry out activities to design tools for reporting on learner performance in Environmental Activities and Science and Technology **Project 1**: Make and use a beam balance. **Project 2:** Make and use a slope/inclined plane.	
Core Competencies to be developed:				

- **Pedagogical content knowledge** as the teacher trainee prepares and peer teaches lessons on simple machines.
- **Assessment** as the teacher trainee carries out activities to design tools for reporting on learner performance in scientific concepts
- **Creativity and innovation** as the teacher trainee makes a functional machine (beam balance and inclined plane)

Value:

- **Unity** and **Respect** as the teacher trainee works in groups.
- **Responsibility** as the teacher trainee uses and cares for the simple machine.

Suggested Formative Assessment Rubric

LEVEL / INDICATOR	EXCEEDS EXPECTATIONS	MEETS EXPECTATIONS	APPROACHES EXPECTATIONS	BELOW EXPECTATIONS
Ability to explain work, power and energy as used in science	Explains work, power and energy as used in science with in depth details	Explains work, power and energy as used in science	Explains work, power and energy as used in science with minimal details	Explains work, power and energy as used in science without details
Ability to relate work, power and energy as used in science	Relates work, power and energy as used in science most precisely	Relates work, power and energy as used in science	Relates work, power and energy as used in science less precisely	Relates work, power and energy as used in science without precision
Ability to determine mechanical advantage, velocity ratio and efficiency of simple machines	Determines mechanical advantage, velocity ratio and efficiency of simple machines	Determines mechanical advantage, velocity ratio and efficiency of simple machines	Determines mechanical advantage, velocity ratio and efficiency of simple machines	Determines mechanical advantage, velocity ratio and efficiency of simple machines

	accurately for any given situations	accurately for all given situations	accurately for most of the given situations	accurately for few of the given situations
Ability to demonstrate the turning effect of force about a point (moment)	Demonstrates the turning effect of force about a point (moment) most effectively	Demonstrates the turning effect of force about a point (moment)	Demonstrates the turning effect of force about a point (moment) less effectively	Demonstrates the turning effect of force about a point (moment) ineffectively
Ability to demonstrate the principle of moments of force of a lever	Demonstrates the principle of moments of force of a lever	Demonstrates the principle of moments of force of a lever	Demonstrates the principle of moments of force of a lever	Demonstrates the principle of moments of force of a lever
Ability to compare classes of levers used in daily life	compare classes of levers used in daily life most effectively	compare classes of levers used in daily life	compare classes of levers used in daily life less effectively	compare classes of levers used in daily life ineffectively
Ability to demonstrate applications of simple machines in daily life	Demonstrates applications of simple machines in daily life most effectively	Demonstrates applications of simple machines in daily life	Demonstrates applications of simple machines in daily life less effectively	Demonstrates applications of simple machines in daily life ineffectively
Ability to select suitable non-formal activities for teaching and learning of science	Selects most suitable non-formal activities for teaching and learning of science	Selects suitable non-formal activities for teaching and learning of science	Selects a few suitable non-formal activities for teaching and learning of science	Selects a few suitable non-formal activities for teaching and learning of science with prompts
Ability to design tools for reporting on	Designs all appropriate tools for	Designs all tools for reporting on learner	Designs most of the tools for reporting on	Designs a few of the tools for reporting on

learner performance in scientific concepts	reporting on learner performance in scientific concepts timely	performance in scientific concepts	learner performance in scientific concepts	learner performance in scientific concepts