Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA)

DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY

YEAR I

Biology Techniques I

Record of Practical Assessment

Learner`s Name:_____

Learner`s NRC no.:_____

Learner`s TEVETA No.:_____

Institution Name:_____

Institution TVA No.:_____

Assessment Period:_____

PREFACE

The Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) is an institution created under the Technical Education, Vocational and Entrepreneurship Training Act Number13 of 1998, as amended by the Technical Education, Vocational and Entrepreneurship Training (Amendment) Act Number 11 of 2005.

The Act among other things provides that TEVETA shall:

(a) regulate and conduct national examinations and assessments relating to technical education, vocational and entrepreneurship training;

(b) charge and collect fees in respect of examinations, assessments and other services provided by the Authority;

(c) award certificates to persons who succeed in examinations and assessments undertaken under this Act

(d) do all such things connected with or incidental to the functions of the Authority under this Act.

Through this mandate, the Assessment and Qualifications Division of TEVETA has developed Practical Assessment Tool Kits to enable learners achieve the competences that are congruent with the demand of the workplace tasks. These tool kits in part are also intended to ensure that similar conditions under which all students in TEVET are assessed and examined apply wherever the course is undertaken in Zambia.

The Trainers shall work with theLearnersto collect evidence of competence, using the benchmarks provided by the unit standards.During the year, the Learners shall be required to undertake a series of practical assessment tasks. It is the sum of all these assessments tasks that deems a Learner to be competent (or not).

This approach to assessment is not a one-off event but one that giveslearners many opportunities to demonstrate skill and allow for the capturing and recording of these demonstrations.

For the Learner to be deemed competent, they must demonstrate competency in every aspect of the practical tasks being undertaken. It must however be understood by the Trainer that Competency does not mean expert. It means that the candidate has attained sufficient skill and knowledge to perform the activity or service to a degree and quality that is acceptable to the industry and the customer in a time within which a competent person at the level could reasonably be expected to perform the task.

While this will be undertaken at institutional level, it is therefore envisaged that the Assessment principles of VALIDITY, RELIABILITY, FAIRENESS and FLEXIBILITY shall at all times be adhered to.

Pre-Assessment

Assessment process explained to the employee (✓ if Yes).	☐
Any appeal relating to the outcome of the assessment or the way in which the assessment was conducted shall be made through the company's *fair treatmentpolicy* as explained to the employee (✓ if Yes).	☐

Employee/Trainee	**Assessor**	
Employee/Trainee name: _____ (Print) Employee/Trainee comments:	Assessor name: _____ (Print) Assessor comments:	
I fully understand the assessment and appeals process.	Theory assessment sighted and checked as satisfactory.	☐
Signature: _____ Date: _____	Signature: _____ Date: _____	

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Range of variables

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1. OSMOSIS	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform experiment demonstrating osmosis correctly. This should include ☐ Cutting 12 uniform potato cubes measuring 2cm by 2 cm and grouping them into three groups A,B and C ☐ Pouring 100 ml of 10%, 5% sugar (or salt) solution into beakers labelled A and B and equal volume of distilled water into another beaker labelled C. ☐ Weighing each group of potatoes cubes, on a mass balance, before immersing it into the beakers labeled A, B and C respectively for half an hour. ☐ After immersion, weighing each group again calculating the changes in the potato masses. ☐ Identifying which group of potato cubes have gained , lost mass or retained mass ☐ Interpret the results	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

2. PLASMOLYSIS IN PLANT CELLS	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3

Perform experiment demonstrating plasmolysis. This should include - Removing the epidermis of the inner surface from one of the fleshy storage leaves of an onion bulb (this can be done by first slitting the leaf with a scalpel and then tearing back a single layer of cells with forceps or fingers) - Quickly transferring the epidermal strip to a slide and adding two pour three drops of 30% salt solution onto the epidermal cells - Covering the slide with coverslip and pressing gently with the thumb to remove air bubbles - Blot drying the slide to remove excess fluids - Mounting the slide onto the stage of a microscope - Finding a clear field of view at scanning power - Examining the cells with a microscope at x 40. - Immediately drawing a few of the epidermal cell and label). - Observing the cells after 30 minutes and drawing a few of epidermal cells - Repeating the experiment using another strip of the epidermal cells and replacing the salt solution with distilled water - Observing the cell at x40 after 30 minutes and making neat labelled drawing - Highlighting the changes in cell appearance when observed immediately after slide preparation, 30 minutes in salt solution and 30 minutes in distilled water/ - Making observation of appearance of cells after 30 minutes in any observable changes in one or more representative cells. - Interpret the results	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

3. FOOD TEST FOR CARBOHYDRATES	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform practical on testing for carbohydrates in food samples. This should include A. BENEDICT'S REAGENT TEST. ☐ Labelling four test-tubes 1-4. ☐ Putting 5ml of 1% starch solution,10% table sugar,10% glucose solution and distilled water into test tube 1,2,3, and 4 respectively ☐ Adding about 2.5 ml Benedict's solution to each tube. ☐ Place the test-tubes in the water bath for approximately 10 minutes and notingoccurrence of colour change to occur. ☐ Placing the four tubes in a test-tube rack and comparing the colours. ☐ Recording the results as shown in the table on the answer sheet template ☐ Putting 5 ml of the solution(s) that showed negative results with benedict'sreagent into labelled test tubes ☐ Putting 2.5 HCL into these test tube boiling the mixture a water bath ☐ Allowing the test tubes contents to cool and then adding 0.5 ml of sodium hydroxide or potassium hydroxide ☐ Adding 2.5 ml of benedict's reagent and leaving them in water bath for 5munites ☐ Taking note of any colour change ☐ Making deduction which solutions contained reducing sugars and non-reducing sugars ☐ Identifying the control test tube in the experiment ☐ Explaining the reason for adding HCL into the test tube containing table sugar ☐ Interpreting the results	☐	☐	☐	☐	☐	☐

B. IODINE TEST - Cleaning the test tubes used in method 1 thoroughly. - Putting5ml of 1% starch solution,10% table sugar,10% glucose solution and distilled water into test tube labelled 1,2,3, and 4 respectively - Adding to each tube about 2.5 ml Lugol's solution and shaking for about 30 seconds. - Record you results in terms of colour change in tabular form - Identifying which test tube tested positive for the presence of starch - Interpreting the results						

Assessor comments:

Signed: Assessor: Trainee:

4. FOOD TESTS FOR PROTEINS USING THE BIURET REAGENT	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical on testing for proteins in food samples. This should include ☐ Putting 2 ml egg white ,full cream milk , egg yolk and water in test tubes labelled 1,2 ,3 and 4 respectively ☐ Adding about 2ml of Biuret reagent to each of the test tubes ☐ Taking note of the colour change if any ☐ Recording the results in tabular form ☐ Identifying the control in the experiment ☐ Identifying which samples contained proteins ☐ Listing any precaution(s) undertaken during the course of the practical ☐ Interpreting the results	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

5. FOOD TEST FOR LIPIDS USING THEETHANOL EMULSION TEST	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical on testing for lipids in food samples. This should include - Labelling four test tubes 1,2,3and 4 - Putting 2cm3 of liquid cooking oil, egg white, table sugar and water into test tubes 1, 2, 3 and 4 respectively. - Adding to each test tub with sample to 2 cm3 of ethanol, and shaking well. - Allowing test tube contents to settle in a test tube rack for 2 minutes for sample solutions to dissolve in ethanol. - Emptying any clear liquid into a test tube containing 2 cm3 of distilled H2O. - Making note of the test tube(s) where a milky-white emulsion is observed and recording these as positive results - Making note of the test tube(s) where the mixture remains clear and recording these as negative result (no lipid present in sample) - Interpreting the results	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

6. EXTRACTION OF DNA FROM ONION TISSUE	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Performing an experiment to extract DNA from onion tissue. This should include □ Chopping the onion into small pieces and placing inside the blender container □ Making a salt solution by dissolving a 50 grams of table salt into 200 ml of warm water in a beaker □ Adding enough of the salty water to just cover the onion in the blender container. □ Blending the mixture for at high speed for about 10 seconds. □ Pouring the onion-salt-water mixture through the strainer and collecting the liquid in a clean beaker. (The DNA from the onion is in this liquid). □ Measuring out 50 ml of the onion liquid filtrate and pouring it into a clean beaker. □ Adding 2 teaspoons of dishwashing detergent to the beaker containing the 50ml onion liquid filtrate and Stirring very gently. □ Measuring out 100 ml of cold methylated spirit and slowly adding it to the beaker containing the onion-detergent mixture. □ Observing to so see the DNA in form of whitish threads rising up from the bottom of the glass. (Patience is required as it may take a few minutes to appear.) □ Transferring the whitish DNA threads onto a clean Petri dish with the aid of a stirring rod □ Adding five drops of phenol red indicator to the DNA in the Petri dish to ascertain the presence of DNA. The resulting orange /yellow color should be due to the presence of DNA.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

7. EFFECT OF TEMPERATURE ON ENZYME ACTIVITY	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform an experiment on to see how temperature will affect the rate at which enzymes function. This should include: - Cutting chicken liver into 4 similar pieces weighing 2 grams - Filling 5 boiling tubes labelled 1 to 5 with 10mL of distilled water each - Placing a piece of liver in each boiling tube 2-5 - Placing boiling tubes 1-3 in the boiling tube rack - Placing boiling tube 4 in a beaker full of ice and letting it cool for 10 minutes - Placing boiling tube 5 in a beaker full of water on a hot plate and letting it to heat for 10 minutes - Adding 5mL of hydrogen peroxide to boiling tubes 1 to 3 one at time - Making observations and measuring the layer of bubbles if it is formed with ruler - Placing boiling tube 4 in the boiling tube rack after it has cooled - Adding 5mL of hydrogen peroxide to boiling tube 4 and recording the observations - Placing boiling tube 5 in the boiling tube rack after it had heated - Adding 5mL of hydrogen peroxide to boiling tube 5 and recording observations - Justifying the role of boiling tube 1 in the experiment - Give the reasons for differences in observation in boiling tubes 2 to 5 - Drawing a graph showing the effect of temperature on the enzyme catalase - Explaining the different regions of the graphical slope drawn	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

8. IDENTIFYING ORGANISMS IN THE KINGDOM PROKARYOTA	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform an experiment on identifying organisms in the Kingdom Prokaryota. This should include - Mounting of prepared slides of *staphylococcus aureus, vibrio cholera, Escherichia coli* and *streptococcus lactis* onto the microscope stage one at a time - Looking for the field of view using scanning power lenses - Observing the slides at x10 objective lens and focusing using the coarse adjustment knob to see the microorganisms - Increasing the power to x40 objective lens and focusing with course and fine adjustment knob to see microorganisms now appearing bigger - Adding a drop of immersion oil onto the slide without moving the stage and increasing the power of objective lens to x100objective lens - Focusing the oil immersion lenses to make the final observation of the microorganisms - Identifying the organisms in the Kingdom Prokaryota based on their shape.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

9. IDENTIFYING ORGANISMS IN THE KINGDOM PROTISTA	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform an experiment on identification of pond water organisms in the Kingdom Protista. This should include - collecting sample of fresh water pond water from three depths ; surface, middle and bottom of pond water andpouring into three labelled beakers - Systematically filling the centrifuge tubes with pond water from different levels and centrifuging at 1500 revolutions per second for 7 minutes. (pond water from varying depths should not be mixed) - Removing the centrifuge tubes from the centrifuge machine, pouring out the supernatant. - Pouring out the sediment into watch glass and observing using the stereoscope or at low power lens of compound light microscope - Observing and identifying pond water organisms likely to be found in fresh water like *Paramecium, Spirogyra, Euglena, Vorticella, Nostoc*	☐	☐	☐	☐	☐	☐

Assessor comments:

10. MAKING AN ENTOMOLOGY BOX	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Undertake a project on preservation techniques by making an entomology. This should include - Capturing of insects (small arthropods) - Killing of captured arthropods - Relaxation of arthropods in a relaxing jar under high humidity to restore flexibility - Pinning of arthropods in the entomology box - Compiling of a classification key to guide identification of displayed arthropods	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: _____ Trainee: _____

11. OBSERVATION OF A TYPICAL ANIMAL CELL (CHEEK CELLS)	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical on observing the typical structure (as seen using compound light microscope) of an animal eukaryotic cell. This should include ☐ Using a tooth pick to scrap the inner cheek surface to obtain epithelial tissue ☐ Spreading the tissue on a glass slide ☐ Adding a drop of methylene blue onto the tissue on the slide to stain it ☐ Adding a drop of glycerin to the tissue ☐ Carefully covering the cells with a cover slip and gently pressing to remove air bubbles ☐ Blot drying the excess dye on the slide using a blotting paper ☐ Mounting of the cheek cells onto the microscope stage ☐ finding the field of view using the scanning objective lens ☐ Increasing the power to x10 objective lens to view the cells shape ☐ Increasing the power to x40 objective lens to observe the nucleus, cell membrane and cytoplasm ☐ Drawing the at least two neat and labeled cheek cells as seen using the x40 objective lens	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

12. OBSERVATION OF A TYPICAL PLANT CELL (ONION)	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical on observing the typical structure (as seen using compound light microscope) of plant eukaryotic cell correctly. This should include - Removing the epidermis of the inner surface from one of the fleshy storage leaves of an onion bulb (this can be done by first slitting the leaf with a scalpel and then tearing back a single layer of cells with forceps or fingers) - Quickly transferring the epidermal strip to a slide and add two pour three drops of distilled water - Adding a drop of methylene blue or iodine onto the slide with epidermal cells to stain them - Carefully covering the cells with a cover slip and gently pressing to remove air bubbles - Blot drying the excess dye on the slide using a blotting paper - Mounting the slide onto the microscope stage - Finding a clear field of view using the scanning lens - Examining the slide to view the epidermal using the x 40 objective lens. - Identifying the cell wall, cytoplasm and nucleus as seen in the epidermal cells Drawing a few of the epidermal cell and labelling thecell wall, cytoplasm and nucleus	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

13. OBSERVATION OF MITOTIC DIVISION	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical on root squash preparation to observe mitotic in onion root tip. This should include ☐ Cutting off a root of onion at its base and put it on a watch glass ☐ Cutting off the root tip about 3mm from the tip, and discarding the rest ☐ using the forceps to transfer the 3mm root tip in to a small beaker containing 3-5 drops of glacial acetic-methanol fixative and leaving this in a water bath at 60 ◦C for 30 minutes ☐ Removing the fixative and rinsing the root tip with distilled water. ☐ Adding 3-5 drops of 1M HCL and hydrolyzing the root tip at 60 ◦C for 15 minutes ☐ Pouring off all the HCL and rinse the root tip with distilled water ☐ Adding 3-5 drops of Feulgen stain* heat for 10 minutes at 60 ◦C ☐ Pouring the entire contents on to a watch glass ☐ Locating the root tip with forceps and mounting it on the drop of 45% acetic acid on a glass slide. ☐ applying a cover slip over the specimen and then using gentle thumb pressure over the cover slip, squash the root tissue onto the slide.(lateral movements of the thumb whilst applying pressure on the cover slip should be avoid to avoid disturbing the chromosomes in the cells) ☐ Blotting out excess stain with blotting paper ☐ Examine the preparation under the microscope first under low power to locate cells undergoing mitosis, then under high power to study the shapes of chromosomes in different phases of mitosis. *Feulgen stain gives best results but it may be replaced by orcein or methylene blue stain in the procedure	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

14. MAKING A SMOKE PRINT OF A SIMPLE LEAF	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical on smoke print to observe and record the structure of a simple leaf. This should include ☐ Filling the bottle with cold water, and cap or cork it tightly. ☐ Covering one side of the outside surface of a bottle with a layer of petroleum jelly. ☐ Holding the bottle over the candle flame, with the petroleum jelly side toward the flame, until it is covered evenly with soot. ☐ Placing a leaf veins up, on a newspaper and rolling the sooty bottle over the leaf. ☐ Removing the sooty leaf from the newspaper and placing it, again with veins up, on a clean newspaper ☐ Placing a piece of white paper over the leaf. ☐ Rolling a clean bottle over the paper that is over the sooty leaf to obtain a smoke print of the leaf. ☐ Preserving the smoke print prepared for assessment ☐ Labelling the smoke print after the print dries (about 4 hours) ☐ Identifying the type of leaf tip, lamina, base, venation and margin exhibited by the sample used ☐ Repeating the exercise using other different types of simple leaves.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

15. MACERATION OF PLANT MATERIAL	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical on maceration of plant material to observe and record the structures of the xylem and phloem components. This should include ☐ Preparing the maceration fluid is by mixing equal volumes of 10% chromic acid with 10% nitric acid ☐ Cut the plant tissue (suggest sample is Rape stalks) into small pieces of not more than 1 mm thick. ☐ Putting the tissue into freshly prepared macerating fluid. ☐ Leaving the tissue in the macerating fluid for about three days. ☐ Teasing the tissue with dissecting needle to check if maceration was successful .If the cells separate easily, they are ready for the next step. ☐ Filtering off the macerating fluid and wash away the acids from the macerated material with water. ☐ Transferring a piece of macerated plant material onto a slide ☐ Staining macerated plant sections with toluidine blue O (TBO) or any other polychromatic dyecorrectly ☐ Placing a cover slip on the slide and pressing gently with thumb ☐ Blot drying the excess stain with blotting paper ☐ Focussing the prepared mount at x10 and x40 objective lenses to view the various stem components ☐ Identifying different xylem and phloem components ☐ The macerated plant material not used for observation may be stored in 70% alcohol for future use.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

16. MONOCOT AND DICOT STEM CROSS SECTIONS	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical onCcutting and staining of monocot and dicot stem cross sections. This should include - Cutting about 15 thin slices of cross sections of the dicot stem (*Bidens pilosa*) using a surgical blade by holding it upright between the thumb and index finger - Preserving the cut sections in Petri dishes containing water - Choosing the best sections(by observing the sections under low power to avoid choosing sections which are oblong) - Staining the sections thoroughly with a drop of Safranin for 3 minutes - Wash the cross sections in water - Choosing one of the best sections and mounting in glycerin on a clean slide - Covering the sections with a cover slip and observe at x10 and x40 objective lenses - Making a neat labelled drawing of the observed features of the dicot stem cross section and taking note of the arrangement of vascular bundles - Repeating prior steps to make cross sections of the monocot stem (Simba grass) sample. - Writing the observations and making well labeled diagrams of the stem sections of monocots under medium power at x10 and x40 objective lenses - Distinguishing the anatomical differences between dicot and monocot stem cross sections based on observations	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

17. MONOCOT AND DICOT ROOT CROSS SECTIONS	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical oncutting and staining of monocot and dicot stem cross sections. This should include - Cutting about 15 thin slices of cross sections of the dicot root (common bean) using a surgical blade by holding it upright between the thumb and index finger - Preserving the cut sections in Petri dishes containing water - Choosing the best sections(by observing the sections under low power to avoid choosing sections which are oblong) - Staining the sections thoroughly with a drop of Safranin for 3 minutes - Wash the cross sections in water - Choosing one of the best sections and mounting in glycerin on a clean slide - Covering the sections with a cover slip and observe at x10 and x40 objective lenses - Making a neat labelled drawing of the observed features of the dicot root cross section and taking note of the arrangement of vascular bundles - Repeating prior steps to make cross sections of the monocot root (Simba grass) sample. - Writing the observations and making well labeled diagrams of the root sections of monocots under medium power at x10 and x40 objective lenses - Distinguishing the anatomical differences between dicot and monocot root cross sections based on observations	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

18. OBSERVATION OF STOMATA IN TERRESTRIAL PLANTS	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical on striping and observing the lower and upper epidermis of terrestrial plants like *Spathecae.* This should include A. Preparing and observing the upper epidermis - Placing the leaf upside down on the bench and scrapping of the parts of the leaf with the help of a scalpel or razor - After scrapping the lower epidermis and internal leaf parts one should remain with the transparent part of the leaf which is the upper epidermis - Placing the upper epidermis on the glass slide with glycerin. - Using the microscope to Focus the image of the slide preparation at x10 and then x40 objective lenses to view if the stomata and guard cell are present - Identifying the stomata and guard and making not of their numbers - Recording the observation in form of labeled drawing and short notes	☐	☐	☐	☐	☐	☐

B. Preparing and observing the lower epidermis - Placing the leaf upside up on the bench and scrapping of the parts of the leaf with the help of a scalpel or razor. - After scrapping the upper epidermis and internal leaf parts one should remain with the transparent part of the leaf which is the lower epidermis - Placing the lower epidermis on the glass slide with glycerin. - Using the microscope to Focus the image of the slide preparation at x10 and then x40 objective lenses to view if the stomata and guard cell are present - Identifying the stomata and guard and making note of their numbers - Recording the observations in form of labeled drawing and short notes - Distinguishing the upper and lower epidermis based on number of stomata	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

19. EXAMINING THE STRUCTURE OF A COMPLETE FLOWER	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Perform a practical on floral dissection.This should include ☐ Examining the flower with hand lens, drawing and labelling the complete flower ☐ Using the razor to remove the petals (ONLY) from the flower without cutting the base of the flower. ☐ Using the razor to carefully remove one of the stamen from the base of the flower. ☐ Using the forceps, to place the stamen in the half Petri dish ☐ Bringing the stamen into focus using the stereomicroscope to make observations, draw and label the parts of the stamen seen ☐ Locating some pollen grains from the anther of the stamen ☐ Making a wet-mount slide of pollen bringing the wet-mount of the pollen into focus under high power using the compound microscope. ☐ Making neat labelled drawings of Pollen Wet-Mount ☐ Using the razor to remove all of the stamens from the flower in order to remain with pistil.	☐	☐	☐	☐	☐	☐

□ Using the forceps to place the pistil in the half Petri dish and bringing into focus using the stereomicroscope. □ Drawing and labelling the parts of the pistil observed □ Placing pistil back to the dissecting platform and using the razor to gently cut the pistil in half lengthwise. □ Using the forceps to place one half of the pistil cut-side up into the half Petri dish and bringing it into focus using the stereomicroscope. □ Drawing and labelling the Longitudinal Dissection of the Pistil □ Locating an ovule from the base of the pistil □ Making a wet-mount slide of an ovule and bringing it into focus under high power using the compound microscope. □ Drawing and labelling observations made of the Flower Ovule Wet-Mount						

Assessor comments:

Signed: Assessor: Trainee:

20. MAKING OF A HERBARIUM FILE	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	3	1	2	3
Carrying out a term project on plant preservation techniques by making of a herbarium file.This should include - Collection of plants parts (roots, flowers, leaves, fruits or seeds) - Pressing of collected plant parts to dry them - Mounting of plant material on clean A4 paper using glue - Compilation of information on each plant material displayed ; should include the classification key (class, generic name, species name and common name), geographical location and habitat form which plant material was collected, the collectors name and date of collection - Display of various plant material in form of a file. Plant material should not form molds and should last for years	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

Final Assessment Summary

Note: refer to mapping document if required

Practical assessment summary	**Satisfactory**	**Not Satisfactory**
1. Osmosis	☐	☐
2. Plasmolysis in plant cells	☐	☐
3. **Food test for carbohydrates**	☐	☐
4. Food tests for proteins using the biuret reagent	☐	☐
5. **Food test for lipids using theethanol emulsion test**	☐	☐
6. Extraction of DNA from onion tissue	☐	☐
7. Enzymatic action: investigation enzymatic action if enzyme catalase	☐	☐
8. Identifying organisms in the kingdom Prokaryota	☐	☐
9. Identifying organisms in the kingdom Protista	☐	☐
10. Making an entomology box	☐	☐
11. Observation of a typical animal cell (cheek cells)	☐	☐

12. Observation of a typical plant cell (onion)	☐	☐
13. Observation of mitotic division	☐	☐
14. Making a smoke print of a simple leaf	☐	☐
15. Maceration of plant material	☐	☐
16. Monocot and dicot stem cross sections	☐	☐
17. Monocot and dicot root cross sections	☐	☐
18. Observation of stomata in terrestrial plants	☐	☐
19. Examining the structure of a complete flower	☐	☐
20. Making of a herbarium file	☐	☐

Assessor comments:

Assessment Outcome

Satisfactory ☐

Not Satisfactory ☐

Employee/Trainee	**Assessor**
Employee/Trainee name: _____ (Print)	Assessor name: _____ (Print)
Employee/Trainee comments:	**Assessor comments:**
Signature: _____ Date: _____	Signature: _____ Date: _____

VALIDATION OF THE ASSESSMENT

NAME:…….. DATE:……..

POSITION: **PRINCIPAL/HEAD OF INSTITUTION** SIGNATURE:……..

NAME INSTITUTION:……

STAMP: