Grade 11 Agriculture

Term 1 - 60 complete lesson plans

Ready to teach, in the KICD lesson-plan format | 40-minute lessons | PDF and editable Word

ABOUT THIS PACK

60 complete, ready-to-teach Grade 11 Agriculture lesson plans for Term 1, covering inorganic fertilisers, water conservation, vegetative propagation, agroforestry and crop protection: pest control.

TOPICS IN THIS PACK

Topic	Name	Lessons
1.1	Inorganic fertilisers	14
1.2	Water conservation	10
1.3	Vegetative propagation	14
1.4	Agroforestry	11
1.5	Crop protection: pest control	11

INSIDE EVERY LESSON PLAN

- The specific learning outcomes, key inquiry question, core competencies, values and PCIs, and the resources needed.
- A timed lesson flow: what the teacher does and what the learners do, from introduction to summary.
- The key content (a worked example, notes or a practical with its expected results), then four practice questions with the answers for the teacher.
- The common mistake to watch for, and ideas for learners who need support and for those ready for more.
- A four-level CBC assessment rubric (EE, ME, AE, BE), homework, and a blank reflection space to fill in after teaching.

A TASTE OF LESSON 1

Plant nutrients: what plants need from the soil

By the end of the lesson, the learner should be able to: a) explain what is meant by an essential plant nutrient; b) group plant nutrients into macronutrients and micronutrients

> **Essential plant nutrients**
> Plants make their own food by photosynthesis, but they also need mineral elements to build their bodies and run their life processes. An element is called essential when the plant cannot complete its life cycle without it, no other element can do its work, and it takes part directly in the plant's growth.

You also receive this pack as an editable Word file, so you can change any lesson to suit your class before you print it. Lessons follow the order of the KICD curriculum design.

CONTENTS

No.	Lesson	Topic	Page
1	Plant nutrients: what plants need from the soil	1.1 Inorganic fertilisers	4
2	Roles of the primary nutrients: nitrogen, phosphorus and potassium	1.1 Inorganic fertilisers	8
3	Roles of secondary nutrients and micronutrients	1.1 Inorganic fertilisers	12
4	Practical: observing crops with nutrient deficiency symptoms	1.1 Inorganic fertilisers	16
5	Categories of inorganic fertilisers: nitrogenous fertilisers	1.1 Inorganic fertilisers	20
6	Phosphatic, potassic and compound fertilisers	1.1 Inorganic fertilisers	24
7	Practical: identifying and categorising fertiliser samples	1.1 Inorganic fertilisers	28
8	Soil sampling: why, when and how	1.1 Inorganic fertilisers	32
9	Practical: collecting a soil sample on the school farm	1.1 Inorganic fertilisers	36
10	Practical: testing soil pH and reading a soil test report	1.1 Inorganic fertilisers	40
11	Calculating fertiliser rates	1.1 Inorganic fertilisers	44
12	Methods of applying inorganic fertilisers; Practical: applying fertiliser	1.1 Inorganic fertilisers	48
13	Soil amendment practices for crop production	1.1 Inorganic fertilisers	52
14	Importance and responsible use of inorganic fertilisers	1.1 Inorganic fertilisers	56
15	Irrigation: meaning, need and sources of water	1.2 Water conservation	60
16	Surface irrigation: basin, furrow and flood	1.2 Water conservation	64
17	Overhead (sprinkler) irrigation	1.2 Water conservation	68
18	Drip (trickle) irrigation	1.2 Water conservation	71
19	Comparing irrigation methods and choosing the right one	1.2 Water conservation	74
20	Efficient approaches to irrigation: saving water	1.2 Water conservation	78
21	Practical: setting up a low-cost drip kit	1.2 Water conservation	82
22	Practical: measuring how much water a crop is given	1.2 Water conservation	86
23	Problems of irrigation and how to manage them	1.2 Water conservation	90
24	Importance of irrigation in crop production in Kenya	1.2 Water conservation	94
25	Vegetative propagation: meaning, advantages and disadvantages	1.3 Vegetative propagation	98
26	Natural propagules: suckers, slips, crowns, splits, rhizomes, tubers and bulbs	1.3 Vegetative propagation	102
27	Propagation by cuttings	1.3 Vegetative propagation	106
28	Practical: preparing and planting stem cuttings	1.3 Vegetative propagation	110
29	Propagation by layering	1.3 Vegetative propagation	114
30	Practical: simple layering and air layering	1.3 Vegetative propagation	118
31	Grafting: terms and conditions for success	1.3 Vegetative propagation	122

32	Methods of grafting: whip and tongue, cleft and side grafting	1.3 Vegetative propagation	126
33	Practical: cleft grafting of seedlings	1.3 Vegetative propagation	130
34	Budding: T-budding and patch budding	1.3 Vegetative propagation	134
35	Practical: T-budding	1.3 Vegetative propagation	138
36	Aftercare of propagated plants and the propagation nursery	1.3 Vegetative propagation	142
37	Tissue culture and modern propagation technologies	1.3 Vegetative propagation	146
38	Importance of vegetative propagation in crop production	1.3 Vegetative propagation	150
39	Agroforestry: meaning and forms	1.4 Agroforestry	154
40	Importance of agroforestry in conserving the environment	1.4 Agroforestry	158
41	Agroforestry practices	1.4 Agroforestry	162
42	Characteristics of good agroforestry trees	1.4 Agroforestry	166
43	Common agroforestry trees in Kenya and their uses	1.4 Agroforestry	170
44	Practical: observing agroforestry trees (excursion)	1.4 Agroforestry	173
45	Establishing a tree nursery and pre-treating seeds	1.4 Agroforestry	177
46	Practical: preparing pots and sowing agroforestry tree seeds	1.4 Agroforestry	181
47	Managing tree seedlings in the nursery	1.4 Agroforestry	185
48	Practical: transplanting and caring for young trees	1.4 Agroforestry	189
49	Adopting agroforestry: challenges and solutions	1.4 Agroforestry	193
50	Crop pests: meaning and kinds of damage	1.5 Crop protection: pest control	197
51	Categories of pests by type and mouthparts	1.5 Crop protection: pest control	201
52	Categories of pests: field and storage, stage of growth and part attacked	1.5 Crop protection: pest control	205
53	Practical: observing, identifying and categorising crop pests	1.5 Crop protection: pest control	209
54	Major field pests of crops in Kenya	1.5 Crop protection: pest control	213
55	Major storage pests and their control	1.5 Crop protection: pest control	217
56	Physical and cultural methods of pest control	1.5 Crop protection: pest control	221
57	Chemical control and the safe use of pesticides	1.5 Crop protection: pest control	225
58	Biological and legislative control, and integrated pest management	1.5 Crop protection: pest control	229
59	Practical: controlling pests by safe methods	1.5 Crop protection: pest control	233
60	Economic importance of pests in crop production	1.5 Crop protection: pest control	237

ELIMU254

Plant nutrients: what plants need from the soil

Strand 1.0 Crop Production > Sub-strand 1.1 Inorganic fertilisers | Lesson 1 of 14 | 40 minutes

SCHOOL	TEACHER	DATE
CLASS / STREAM	TIME	ROLL (B / G)

SPECIFIC LEARNING OUTCOME(S)

By the end of the lesson, the learner should be able to: a) explain what is meant by an essential plant nutrient; b) group plant nutrients into macronutrients and micronutrients

KEY INQUIRY QUESTION(S)

- How do inorganic fertilizers influence crop production?

CORE COMPETENCIES, VALUES AND PCIS IN THIS LESSON

COMPETENCY	**Communication and collaboration**	Learners explain their thinking to a partner and report their findings to the group.
COMPETENCY	**Critical thinking and problem solving**	Learners choose a method, check their answers and give reasons for their choices.
VALUE	**Responsibility**	Learners look after shared materials and finish every task.
PCI	**Environmental awareness**	Examples link to caring for the school and home environment.
PCI	**Safety**	Learners follow safety rules when using materials and moving about.

LEARNING RESOURCES

Charts of plant nutrients and their deficiency symptoms | Pictures or video clips of crops showing deficiency symptoms | Manila paper and marker pens for presentations | Notebooks, pencils and rulers | Calculators for fertiliser calculations | Digital devices with safe internet access (where available)

ORGANISATION OF LEARNING

Whole class for introductions and summaries; groups of four to five for specimen observation, soil sampling, fertiliser identification and application; individual calculations and notes.

KEY WORDS

essential element | macronutrient | micronutrient | deficiency symptom | chlorosis | straight fertiliser | compound fertiliser | fertiliser grade | top dressing | soil pH | liming | soil sample

THE LESSON AT A GLANCE

Introduction	Teacher models	Guided practice	On their own	Wrap-up
6 min	9 min	10 min	9 min	6 min

LESSON FLOW

Stage	Minutes	The teacher	The learners
Introduction	6	Greet the class and ask: "Two maize plots were planted on the same day. One is tall and dark green; the other is short and yellow. Both got the same rain. Suggest what could make the difference." Take two or three answers, link them to earlier work, then state today's outcome.	Answer the starter question, recall what they already know and read the outcome aloud.
Step 1: Teacher models	9	Take learners through "Essential plant nutrients" (key ideas on the next page), explaining as you go. Use charts of plant nutrients and their deficiency symptoms, pictures or video clips of crops showing deficiency symptoms, manila paper and marker pens for presentations. Ask learners to predict what comes next before you show it.	Watch, predict the next step, ask questions and note the key steps in their exercise books.
Step 2: Guided practice	10	Give questions 1 and 2. Move round the groups, ask "How do you know?" and correct errors kindly on the spot.	Work in pairs or small groups, explain each step to a partner and check one another's answers.
Step 3: Independent practice	9	Set questions 3 and 4 for individual work. Mark as you walk round and note who needs help in the next lesson.	Work on their own, then swap books with a partner to check.
Summary and conclusion	6	Ask two or three learners to state the key idea in their own words. Give this exit question and check the answers: "Name four micronutrients."	Say the key idea in their own words and answer the exit question in the exercise book.

KEY IDEAS

Essential plant nutrients

Plants make their own food by photosynthesis, but they also need mineral elements to build their bodies and run their life processes. An element is called essential when the plant cannot complete its life cycle without it, no other element can do its work, and it takes part directly in the plant's growth.

Carbon, hydrogen and oxygen come from air and water. The rest come from the soil. Macronutrients are needed in large amounts: the primary ones are nitrogen (N), phosphorus (P) and potassium (K); the secondary ones are calcium (Ca), magnesium (Mg) and sulphur (S). Micronutrients (trace elements) are needed in very small amounts but are just as essential: iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B), molybdenum (Mo) and chlorine (Cl).

N, P and K are called the primary nutrients because crops remove them from the soil in the largest amounts, so they run short first. This is why most fertilisers sold in Kenya supply N, P and K.

PRACTICE QUESTIONS - WITH ANSWERS FOR THE TEACHER

No.	Question	Answer
1	What makes a plant nutrient "essential"?	**The plant cannot complete its life cycle without it, no other element can replace it, and it takes part directly in growth.**
2	Name the three primary macronutrients.	**Nitrogen, phosphorus and potassium.**
3	Name the three secondary macronutrients.	**Calcium, magnesium and sulphur.**
4	Name four micronutrients.	**Any four of: iron, manganese, zinc, copper, boron, molybdenum, chlorine.**

WATCH OUT FOR

Learners think micronutrients are less important because they are needed in small amounts. A shortage of any essential element limits growth just as badly.

ASSESSMENT RUBRIC - THE FOUR CBC LEVELS

Level	What the learner can do
Exceeds expectations (EE)	Can explain what is meant by an essential plant nutrient confidently and accurately, explain the method used, and apply the idea to new or unfamiliar problems.
Meets expectations (ME)	Can explain what is meant by an essential plant nutrient accurately in familiar situations; notices and corrects slips without help.
Approaches expectations (AE)	Can partly explain what is meant by an essential plant nutrient, or does so with prompts from the teacher or a partner; makes some errors.
Below expectations (BE)	Cannot yet explain what is meant by an essential plant nutrient without direct help; needs the idea taught again with concrete objects.

SUPPORT AND EXTENSION

Learners who need support	Give learners cards with element names and symbols and ask them to sort them into "large amounts" and "small amounts".
Learners ready for more	Why do crops grown on the same land every season for many years give lower yields if nothing is added to the soil? (Answer: Each harvest removes nutrients from the field, so the soil runs short, especially of N, P and K)
Inclusion	Seat learners with low vision near the board and read aloud whatever you write; use large, clear, tactile materials; allow extra time; pair with a patient partner; use gestures or Kenyan Sign Language for the key words.

HOMEWORK AND FOLLOW-UP

Redo questions 3 and 4 neatly in the exercise book. Then tell someone at home what you learned about "plant nutrients: what plants need from the soil" and bring one question of your own to ask next lesson.

TEACHER SELF-CHECK

- Did every learner get a turn to handle materials or explain their thinking?
- Did most learners meet the outcome? Write down the names of those who did not.
- Was the pace right — did any step take too long or too short a time?
- Which competency and value did I see learners showing?
- What will I change the next time I teach this lesson?

REFLECTION ON THE LESSON / SELF-REMARKS

Write this after teaching - what worked, what to change, which learners need follow-up.

ELIMU254

Roles of the primary nutrients: nitrogen, phosphorus and potassium

Strand 1.0 Crop Production > Sub-strand 1.1 Inorganic fertilisers | Lesson 2 of 14 | 40 minutes

SCHOOL	TEACHER	DATE
CLASS / STREAM	TIME	ROLL (B / G)

SPECIFIC LEARNING OUTCOME(S)

By the end of the lesson, the learner should be able to: a) state the roles of nitrogen, phosphorus and potassium in crops; b) describe the deficiency symptoms of N, P and K

KEY INQUIRY QUESTION(S)

- How do inorganic fertilizers influence crop production?

CORE COMPETENCIES, VALUES AND PCIS IN THIS LESSON

COMPETENCY	**Communication and collaboration**	Learners explain their thinking to a partner and report their findings to the group.
COMPETENCY	**Critical thinking and problem solving**	Learners choose a method, check their answers and give reasons for their choices.
VALUE	**Responsibility**	Learners look after shared materials and finish every task.
PCI	**Environmental awareness**	Examples link to caring for the school and home environment.
PCI	**Safety**	Learners follow safety rules when using materials and moving about.

LEARNING RESOURCES

Charts of plant nutrients and their deficiency symptoms | Pictures or video clips of crops showing deficiency symptoms | Manila paper and marker pens for presentations | Notebooks, pencils and rulers | Calculators for fertiliser calculations | Digital devices with safe internet access (where available)

ORGANISATION OF LEARNING

Whole class for introductions and summaries; groups of four to five for specimen observation, soil sampling, fertiliser identification and application; individual calculations and notes.

KEY WORDS

essential element | macronutrient | micronutrient | deficiency symptom | chlorosis | straight fertiliser | compound fertiliser | fertiliser grade | top dressing | soil pH | liming | soil sample

THE LESSON AT A GLANCE

Introduction	Teacher models	Guided practice	On their own	Wrap-up
6 min	9 min	10 min	9 min	6 min