The Fundraiser Production Plan

The enterprise club makes banana loaves and mandazi trays using at most 12 flour units and 12 oven units. It must choose the plan with greatest profit.

THE MISSION	Recommend one plan: (6,0), (4,4) or (0,6). Show that it is feasible and earns the greatest profit.

Clear situation. Visible reasoning. A decision you can defend.

Lesson at a glance

CURRICULUM FOCUS	Senior 4 Mathematics - Linear Programming. Suggested time: 60-75 minutes or two classroom periods.

Learning outcomes

define decision variables; write resource constraints; identify feasible points; evaluate an objective function at corner points

Teaching sequence

1. Read the situation without calculating.
2. Ask learners to identify known and unknown information.
3. Build the mathematical representation together.
4. Model one worked example and explain each decision.
5. Let learners complete the quick checks.
6. Finish with the scenario challenge and a written justification.

TEACHER PROMPT	Do not ask only, 'What is the answer?' Ask, 'What does this number mean in the situation, and how can we check it?'

Foundation teaching notes

Flour

2x + y <= 12, because a loaf uses 2 flour units and a tray uses 1.

Oven

x + 2y <= 12, because a loaf uses 1 oven unit and a tray uses 2.

Profit

P = 6,000x + 5,000y. Test this rule at every feasible corner.

Worked model

AXIS CORNERS	P(0,0) = 0 and P(6,0) = UGX 36,000.
INTERSECTION	P(4,4) = 6,000(4) + 5,000(4) = UGX 44,000.
FINAL CORNER	P(0,6) = UGX 30,000. The maximum is UGX 44,000.

Practice answers

1. Yes: both resource totals are 9.
2. UGX 37,000
3. Each constraint gives 15, above the limit of 12.
4. UGX 36,000; UGX 44,000; UGX 30,000.

Support

Keep the situation visible. Let learners label quantities and units before calculating. Break one long method into short decisions and require a check after the answer.

Stretch

Ask learners to change one number in the situation, predict how the answer will change, then solve and compare with the prediction.

Final scenario - complete response

CHALLENGE	Recommend one plan: (6,0), (4,4) or (0,6). Show that it is feasible and earns the greatest profit.

Choose (4,4). It uses exactly 12 flour units and 12 oven units, and earns the maximum profit of UGX 44,000.

What a strong response contains

- a correct mathematical representation;
- visible calculation steps;
- a check against the original situation;
- a clear final sentence that answers the real problem.

EXIT TICKET	Ask the learner to complete: 'My answer is reasonable because ...'