Grade 7 Agriculture and Nutrition

Terms 1, 2 and 3 - notes for 14 topics

IN EVERY TOPIC

- What you will learn and the key words.
- Short, clear notes with worked examples.
- Questions to try and a topic test, with the answers at the back.

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Strand 1.0 Conservation of Resources | Term 1

1.1 Controlling Soil Pollution

WHAT YOU WILL LEARN

By the end of this topic you should be able to:

- explain the causes of soil pollution in gardening
- control soil pollution in the home environment
- demonstrate responsibility in using safe farming practices to conserve the soil

KEY WORDS

soil pollution, pollutant, wastewater, fertiliser, agrochemical, biodegradable, compost, soak pit.

1. What soil pollution is

Soil pollution is the presence of harmful substances in the soil that damage soil life, plants, animals and people.

Healthy soil is full of living things (earthworms, microorganisms), holds water and air, and grows healthy crops.

Polluted soil: plants grow poorly, earthworms die, harmful substances enter food and water.

We depend on soil for most of our food, so protecting it protects our health.

2. Causes of soil pollution

Causes (from the design)

Wastewater: soapy, oily or chemical water poured on the ground.

Excessive use of artificial fertilisers: makes soil acidic and harms soil life.

Agricultural chemicals (pesticides, herbicides) used wrongly or spilled; used chemical containers thrown away carelessly.

Plastic wastes: do not rot, block air and water, and release harmful substances.

Others: used batteries, motor oil, broken glass.

3. Safe disposal of household wastewater

Practical: a simple soak pit

Materials: jembe, spade, stones, gravel; teacher supervises digging.

Dig a pit about 1 m deep away from wells and buildings; fill with large stones at the bottom and gravel on top.

Pour soapy and oily wastewater into the soak pit, not onto the garden.

Other safe practices: use slightly soapy water from rinsing on flower beds only in small amounts; never pour paint, oil or chemicals on the ground.

4. Managing plastic wastes

Practical: sorting waste

Materials: gloves, three sacks.

Sort school waste into biodegradable (food remains, leaves), plastic, and other (glass, metal).

The 3 Rs: Reduce (use baskets and cloth bags), Reuse (bottles as planters), Recycle (sell or give plastics to recyclers).

Never burn plastics: the smoke is poisonous.

Biodegradable waste goes to the compost pit to feed the soil.

5. Correct use of fertilisers and farm chemicals

Safe practices

Use the correct type and amount of fertiliser (follow the label or an extension officer's advice).
Use manure and compost to reduce artificial fertiliser.
Use farm chemicals only when needed, by trained adults with protective clothing.
Do not wash spray pumps in rivers or near wells.
Return or safely dispose of empty chemical containers as instructed; never reuse them for food or water.

6. Creating awareness against soil pollution

Awareness messages (from the design): against improper disposal of wastewater, dumping of soil pollutants and used chemical containers, plastic wastes, and wrong amounts of farm chemicals and fertilisers.

Forms: posters, songs, poems, short talks at assembly, messages for parents' meetings.
Sample slogan: "Healthy soil, healthy food, healthy people: keep our soil clean!"
Groups prepare and display one message each.

7. Responsible farming practices to conserve soil

Responsible practices: compost and manure use; correct fertiliser amounts; safe waste disposal; reducing plastics; keeping chemicals away from gardens and water; mulching and cover crops to protect soil life.

Activity: each learner makes a personal commitment card ("At home I will...") and a school garden rule list.
Check-up: one week later, report on what was done at home.

TRY THESE

1. What is soil pollution?
2. Name one sign of polluted soil.
3. Give three causes of soil pollution.
4. Why are plastics harmful to soil?
5. What is a soak pit?
6. Where should a soak pit be dug?
7. What are the 3 Rs?
8. Where should food remains go?
9. Who should advise farmers on fertiliser amounts?
10. Name one natural alternative to artificial fertiliser.
11. Name two forms of awareness messages.
12. Write a short slogan against plastic waste.
13. Give three responsible soil practices.
14. What is mulching?

TOPIC TEST

T1. How can polluted soil affect people who do not farm?
T2. Why should a car never be washed with detergent in the garden?
T3. How could rinse water be reused safely?
T4. Make a planter from a used plastic bottle.
T5. Why does too much fertiliser pollute rivers too?
T6. Compose a four-line song against soil pollution.
T7. Report after one week on your commitment.

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1.2 Constructing Water Retention Structures

WHAT YOU WILL LEARN

By the end of this topic you should be able to:

- describe how surface run-off can be used in gardening
- construct water retention structures to conserve surface run-off
- adopt utilisation of surface run-off in gardening

KEY WORDS

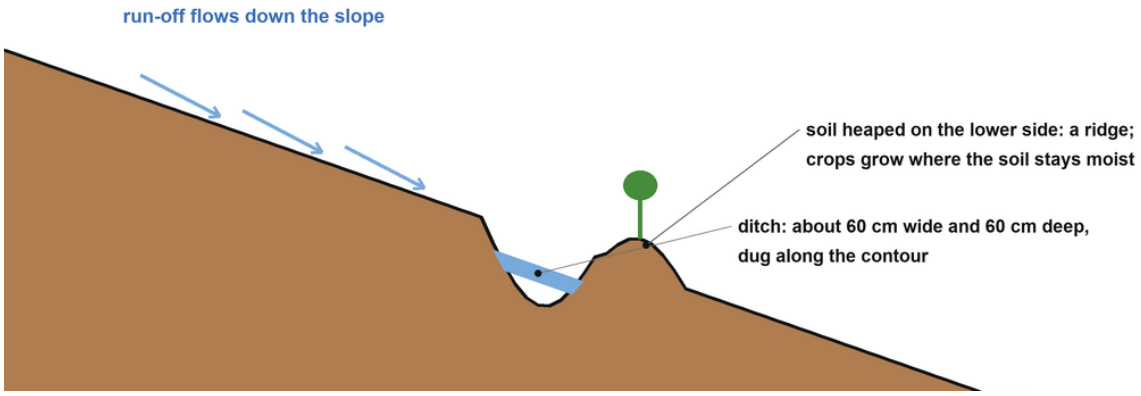
surface run-off, retention ditch, retention pit, zai pit, contour, infiltration, erosion.

1. Surface run-off and its uses

Surface run-off is rain water that flows over the ground instead of soaking in.
Problems: it carries away topsoil (erosion), forms gullies and floods paths, and the water is lost.
Uses when harvested: watering crops in dry spells; recharging soil moisture; growing water-loving crops (bananas, sugarcane, arrowroot, napier grass).
Structures: retention ditches (trenches along the slope) and retention pits (holes that collect water).

2. Retention ditches

A retention ditch is a trench dug across a slope, following the contour (a line at the same level).
It catches run-off, stops it flowing down the slope, and lets it soak into the soil.
Typical size for a school garden: about 60 cm wide and 60 cm deep; soil is heaped on the lower side to form a ridge.
Crops are planted on or along the ridge where the soil stays moist.



A retention ditch across a slope

3. Retention pits (zai pits)

A retention pit is a hole that collects run-off and holds moisture for a crop.
Zai pits: small pits about 60 cm wide and 60 cm deep, filled partly with manure and topsoil, with a small soil bank on the lower side.
Larger planting pits (about 90 cm by 90 cm) suit bananas.
Advantages: hold water and nutrients near roots, cheap, made with simple tools.

4. Planning the water retention project

Planning

Choose a site where run-off flows, with the school's permission.
Choose the structure (ditch or pits) and the crop (banana sucker, sugarcane, napier grass or arrowroot).
Measure and mark the site with pegs and string.
List tools and materials; assign roles; plan safety (the teacher supervises digging tools; wear gloves).

5. Practical: digging the retention structure

Practical: constructing the structure

Materials: jembes, spades, tape measure, pegs, gloves; teacher supervises.
Clear the marked site.
Dig the ditch or pits to the planned size; place topsoil to one side and subsoil to the other.
Form the soil bank or ridge on the lower side.
Check the depth with the tape measure.
Rest, drink water, and work in turns.

6. Practical: planting a crop in the structure

Practical: planting

Materials: manure, topsoil, planting material.
Mix topsoil with well-rotted manure and return it to the pit or along the ridge.
Plant the banana sucker, sugarcane setts, napier grass splits or arrowroot.
Firm the soil around the plant and water it if the soil is dry.
Mulch with dry grass to keep moisture in.

7. Caring for the crop and observing the structure

Care activities: weeding, adding mulch, repairing the ridge, removing silt from the ditch, watering in long dry spells.

Observation record: date, rainfall (from the class rain gauge), water level in the structure, crop height and colour.
Compare with a crop planted on bare ground without a structure.

8. Adopting run-off harvesting in gardening

Benefits seen: moist soil, greener crops, less erosion, less need for watering.

Other ways to use run-off: channel it into tanks or ponds, use roof water for gardens, plant grass strips.
Adoption: learners explain the structure to parents and help make one at home.

TRY THESE

1. What is surface run-off?
2. Give one problem caused by run-off.
3. How is a retention ditch dug?
4. Where is the dug soil heaped?
5. What is a retention pit?
6. What is mixed into a zai pit?
7. How should a site be chosen?
8. What is used to mark the site?
9. Why keep topsoil separate from subsoil?
10. Where is the ridge formed?

11. What is mixed with topsoil before planting?
12. Why mulch after planting?
13. Name three care activities.
14. Why remove silt from the ditch?
15. Give two benefits of water retention structures.
16. Name another way to use run-off.

TOPIC TEST

T1. Why does run-off increase on bare ground?
T2. How could a learner find the contour on a slope?
T3. Why put the soil bank on the lower side?
T4. Draw a plan of your site with the structure marked.
T5. Record in your notebook the size of the structure dug.
T6. How will you know the structure is working after rain?
T7. Draw a graph of crop height over four weeks.
T8. Plan a retention pit for a fruit tree at home.

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Strand 1.0 Conservation of Resources | Term 1

1.3 Conserving Food Nutrients

WHAT YOU WILL LEARN

By the end of this topic you should be able to:

- identify ways of conserving vitamins and minerals in vegetables
- conserve vitamins and minerals in vegetables
- adopt conservation of vitamins and minerals in vegetables

KEY WORDS

vitamin, mineral, nutrient, water-soluble, leaching, overcooking, blanching, steaming.

1. Vitamins and minerals in vegetables

Vegetables are a main source of vitamins and minerals, which protect the body from disease.

Vitamin A (carrots, pumpkin, dark green leaves): good eyesight and healthy skin.

Vitamin C (sukuma wiki, cabbage, tomatoes, managu): heals wounds, fights infection.

Iron (dark green leaves such as spinach, managu, terere): healthy blood.

Calcium (dark green leaves): strong bones and teeth.

Vitamin C and the B vitamins dissolve in water and are easily destroyed by heat and air, so vegetables lose them quickly if handled badly.

2. How vitamins and minerals are lost

Ways nutrients are lost

Wilting and long storage in the sun: vitamin C is destroyed by heat and air.

Soaking cut vegetables in water: vitamins dissolve into the water (leaching).

Peeling thickly: many nutrients lie just under the skin.

Cutting too small or too early: more surface is exposed to air.

Overcooking and cooking with too much water that is thrown away.

Cooking without a lid, and reheating many times.

3. Conserving nutrients during buying, harvesting and storage

Handling

Harvest or buy vegetables fresh and use them soon.

Harvest in the cool morning or evening, not in the hot afternoon.

Store in a cool, shaded, airy place (a covered basket, a cool corner or a charcoal cooler); keep leaves away from direct sun.

Do not bruise or crush vegetables; damaged parts lose nutrients faster.

Choose firm, brightly coloured vegetables, not yellow or wilted ones.

4. Washing, peeling and cutting vegetables correctly

Practical: preparing vegetables

Materials: vegetables, clean water, basins, knives, chopping boards.

Wash whole vegetables in clean running water before cutting, not after.

Do not soak cut vegetables in water.

Peel thinly or scrub (carrots, potatoes) instead of peeling where possible.

Cut just before cooking, into fairly large pieces; use a sharp knife so leaves are not crushed.

Knife safety: cut on a board, away from the body, and keep fingers curled.