education

Department:
Education
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

Common Task for Assessment

Grade 9

2007

SECTION A

TEACHER'S GUIDE

Time: 4 hours
✓ Marks: 120/2 = 60
No. Pages: 29

SUMMARY SHEET

Task 1	Lo	Activity	Assessment Tool	Resources	Mark	Time
Food security	1 & 2	Activity 1.1	Memorandum	No resources required	**18/2 = 9**	**30** minutes
Task 2	**Lo**	**Activity**	**Assessment Tool**	**Resources**	**Mark**	**Time**
Indigenous Technology	1 & 3	Activity 2.1	Memorandum	No resources required	**22**	**30** minutes
Task 3	**Lo**	**Activity**	**Assessment Tool**	**Resources**	**Mark**	**Time**
Indigenous Technology	1 & 2	Activity 3.1 Activity 3.2	Rubric and rating scale Worksheet and memorandum	Morogo Pot or tin Corrugated iron (Zinc) sheets or flat rock	**29** 19 20/2 =10	**30** minutes **30** minutes
Task 4	**Lo**	**Activity**	**Assessment Tool**	**Resources**	**Mark**	**Time**
Indigenous Technology	1 & 3	Activity 4.1 Activity 4.2 Activity 4.3 Expanded opportunity	Rating scale Flow chart Rubric	No resources required	**20** 12/2=6 7 7	**55** minutes
Task 5	**LO**	**Activity**	**Assessment Tool**	**Resources**	**Marks**	**Time**
Recycling	2	Activity 5.1 Activity 5.2 Activity 5.3 Activity 5.4	Memorandum Rubric and Rating scale Rubric	Plastic information Samples of 6 types of plastic Burn test – Bunsen burner or cigarette gas-lighter Hot water & container Kitchen knife Hammer or rock	**40** 10 10 12 8	**65** minutes
TOTAL					**120/2 Marks 60**	**240 Minutes**

TABLE OF CONTENTS

N.B.: Under no circumstances may the CTA Learner books be sent home. If additional research off-campus is allowed in order to enrich the learning process, the information gathered must be brought to school and transferred into the learner's book in his/her own words, in your presence.

Teachers who allow the CTA or any of its associated documents to leave the school premises without permission, are exhibiting unprofessional conduct. You are obliged to ensure that the work represents the abilities of the Grade Nine learners themselves.

All educators must ensure that the CTA gains the desired credibility.

WHAT IS THIS CTA ALL ABOUT?

This Common Task for Assessment (CTA) is the first assessment developed within the framework of the National Curriculum Statement (NCS) to be implemented nation wide.
It consists of two sections. We no longer use C2005 terminology like Phase and Programme Organisers. While it is not a requirement, we have used a theme to link parts of the CTA into a coherent document.

Section A (60 marks), which covers all three Learning Outcomes, focuses primarily on Processing, and is done as a short learning programme. Section B (40 marks), which covers all aspects of LO2, namely Structures, Systems & Control and Processing, and some aspects of LO1, and is done as a two-hour examination.

SCOPE OF THE CTA

The 2007 CTA uses **Globalisation** as a major underlying theme. We have succeeded in striking a balance between various South African contexts in the modules.
This year we pay special attention to **globalisation and resource management**, using the sub-theme "*Think globally but act locally"* – what we do with our resources can have an impact on the rest of the planet.

People often use resources like energy, food or materials in unsustainable, harmful and wasteful ways without thinking about the consequences of their actions.

Section A is a short learning programme focussing mainly on **processing**.
We will examine how materials can be processed to change or improve properties (life-span). As we do this we will compare how different cultures solve similar challenges in unique ways.

Foods have to be stored for extended periods-of-time. This has always been so, and different cultures have developed *preservation* technologies appropriate to their own circumstances.

Collection of **Medicinal Plants** needs to be planned in a *sustainable* way to avoid resource depletion, and the plants need to be processed to provide medication. In this section, we will also deal with intellectual property, royalties, plagiarism and acknowledgement of these rights.

Plastics, while being extremely useful, are responsible for wide-spread pollution, yet they are easily recyclable and can be reused or remanufactured into new products.

First the CTA will create awareness among learners and attempt to assist them in reducing the wastage of resources, which has an impact beyond their local area.
While doing the CTA, **they must do the tasks at school**. They will also have opportunities to conduct their own research, as required by some tasks, at home; and thus be able to bring quality feedback to school. All research must be translated into their own words and all sources of information must be recognised and acknowledged in a properly structured bibliography (They should know how to format a bibliography by now).

They should avoid plagiarism and teachers must penalise any learner guilty of this. Watch for American spelling of words, vocabulary untypical of South African teenagers, and for blocks of text that have been cut and pasted blindly into documents. Learners should have been taught to summarise and to scan or skim through articles to identify relevant information.

MANAGING THE CTA

Section A is a Learning Programme with a specific focus and counts 120/2 = 60 marks. It must be done in class under your guidance. Like any Learning Programme, you will guide and provide formative feedback as the learner's progress through the tasks. Some aspects may require some preparatory teaching, especially if you have not focussed on a specific aspect during the year. Section A of the CTA must be facilitated by the Learning Area teacher, and may not, under any circumstances, be ***invigilated*** by non-technology teachers.

Section B is in examination format counting 80/2 = 40 marks, and will be invigilated. In this CTA, it is independent of Section A since it contains questions based on the work you should have done during the year in your school's CASS programme, which should have targeted all Assessment Standards of Technology.

Facilitate learner progress as they work through the Section A activities. Do not invigilate, but rather participate actively as you manage the CTA, guiding and assessing the learners continuously. Explain complex concepts and unfamiliar terminology if the learners do not understand them. Give feedback when necessary to help them to understand. **The tasks are designed as class work activities**. Activities expose them to different elements of processing and are intended to complement each other as they develop an understanding of thinking globally while acting locally.

ASSESSMENT

Each activity contains questions that probe learner understanding of the topic. There is a balance between more and less challenging questions. Thought-provoking questions are given more marks than those based on just recalling knowledge. Rubrics, memoranda and rating scales will be used for assessing appropriate activities, e.g. Team dynamics, graphic skills, etc.

Individual performance will be assessed, as well as team dynamics.

EXPANDED OPPORTUNITY

Two opportunities have been created to enable learners to improve their marks by doing additional work.

Although this implies extra marking for you, in reality it should be restricted to the few learners who are motivated enough to attempt to earn the additional marks.

Expanded opportunities can be given to learners who have already achieved the assessment standards but are willing to improve their performance; the teacher can therefore record the best performance between the two performances. In addition, learners who have not yet demonstrated competence can be given expanded opportunities to show their competence.

RESOURCES:

Before learners can do Task 5 they will need to collect samples of six different types of plastics. These are easily obtainable from common household containers or articles. The collection must be a team effort and they need to start assembling their collections now, so that they have a full set by the time they need them for Activity 5.2 and 5.3. The types of plastics are called:

PET; PE-HD; PVC; PE-LD; Project Portfolio and PS

The list below gives them some possible sources of the six different types – they should collect at least one sample of each. Organise that teams start now so that their collections are complete when they need it. **It will be advisable for teachers to collect a set of samples in case some learners are unable to find enough samples.**

1. **PET** - cooldrink bottles, washing liquid bottles, preserved fruit containers
2. **PE-HD** - milk bottles, motor oil containers, buckets, crates and bags
3. **PVC** - clear trays for food and toiletries, clear bottles, pipes, gutters
4. **PE-LD** - frozen vegetable bags, garbage bags, building film, soft squeeze bottles
5. **PP** - bottle caps, automotive battery cases, cups and plates
6. **PS** - HD or Crystal Polystyrene .....e.g. CD Cases
   HIPS or High Impact Polystyrene .....e.g. TV cabinets, monitor cabinets
   LD or Expanded Polystyrene .....e.g. Disposable plates and cups, yogurt containers, takeaway food trays

THEME: GLOBALISATION
SUB-THEME: THINK GLOBALLY AND ACT LOCALLY
PRINCIPLES: SOCIAL JUSTICE, HUMAN RIGHTS, INCLUSIVITY AND A HEALTHY ENVIRONMENT

The Critical and Developmental Outcomes, listed in the Learner's Guide, were used during the planning of this CTA.

Requirements:
Learners must collect all their investigations, response to questions, sketches, and working drawings in a CTA Portfolio.

How will you assess?

Learners will be assessed on their abilities to:

- **Investigate**:
  - the **indigenous** methods of food preservation
  - the recognition of **Intellectual Property Rights**
  - the **impact** of materials on people and on the natural environment
- **Research information**
- **Identify a problem or opportunity** from a given context
- Dry morogo and **evaluate your product** against a given rating scale**.**
- **Develop and perform practical testing** to compare properties of plastics**.**
- **Communicate** – Present inputs in a logical and well structured manner.
- **Use and manage resources in a sustainable manner.**

AND

Learners will be assessed on their ability *to work effectively as individuals and as a member of a team* and on their ability *to manage time and resources effectively.*

The following rubric will be used to assess all occasions where teamwork is required.

Team Dynamics Rubric Teacher Assessment MODE: Team

CODE	Level Descriptor:
7	**All** team members performed their roles effectively. They cooperated well and supported each other, assisting weaker learners to achieve without taking over the task for them.
6	**All** team members performed their roles effectively. They cooperated well and allowed each team member to do his/her share.
5	**All** team members performed their roles effectively, although they argued often.
4	**Some** team members worked well but took over the tasks of others and did not allow them to participate
3	**Some** team members worked well but the project was completed only because some individuals did the work while others made no attempt to assist.
2	The team members cooperated in a half-hearted manner and the product produced is of poor quality
1	Failed to cooperate. Could not produce a finished product on time

Divide your learners into teams of 4 or 6 learners for most activities.

Please note that whenever societal problems are analyzed, it is important that they think about the principles of Social Justice, Human Rights, Inclusivity of members of the society, and a Healthy Environment.

CONTEXT

Food security is a system of meeting long-term food needs. It goes beyond production also to include preservation and storage.

"In situations of poverty as currently exist in South Africa, where malnourishment of children under five is almost at 20% in areas in which we work, food security interventions have to be addressed within the broader context of poverty alleviation,"

" It is not just to have food stored for one year but also think about the next 2 or 3 years in case of drought (Note: *As global warming increases, South Africa is likely to become drier than it has been in the past*). Food security is not just having vegetables such as spinach, cabbage, onions, tomatoes, green beans, pumpkins, etc. It means taking into account the basic food needs which sustain cultural food requirements the community is accustomed to. Different food requirements of cultural groups of indigenous people of South Africa vary from mealie-meal, processed mealies, sorghum, millet, dry beans, peanuts, melons, sweet cane and the traditional pumpkin which also provides a green vegetable for a period stretching into winter."

[*Extracted from a speech by* ***Ms Tshepo Khumbane*** *addressing the Integrated Permaculture Conference in Australia – 1997*]

Task 1

. Minutes 30 ✔Marks 18 divide by 2

FOOD SECURITY

This task deals with the deterioration of foods and the factors that cause food to spoil. Once they understand what causes spoilage, they will be able to consider suitable strategies to counteract these causes. A number of issues can be identified using the **mind maps 1-3** provided in the Learner's Guide, but they will need additional input from you if you did not cover food in the Assessment Standard during the year. Encourage them to find out additional information at home e.g. ask an adult, read a library article, or surf the internet. Do not allow them to plagiarise information – check that they rewrite information in their own words and acknowledge their sources properly. Some aspects of social justice and inclusivity are touched on.

Activity 1.1 Case Study - **Investigating the Causes of Food Spoilage**

Time: 30 minutes Marks: 18/2 = 9 Individual Work Teamwork

LEARNING OUTCOMES AND ASSESSMENT STANDARDS ADDRESSED:

Lo1:	**Technological Processes and Skills**
AS:	Investigates
	Analyse existing products relevant to an identified problem (food spoilage) based on safety and manufacturing method.
Lo2	**Technological Knowledge and Understanding**
AS:	Processing
	Demonstrates knowledge and understanding of how materials can be processed to change or improve properties (life-span) e.g. frozen, dried, etc.

Assess learners on the following:

- Knowledge of different safe storage methods
- Knowledge of causes of food spoilage

Learners study the mind maps in their groups and discuss the different factors that are involved in spoilage of food, and then think about ways to combat these damage-causing factors. Use your professional judgement to evaluate answers that should resemble those given below.

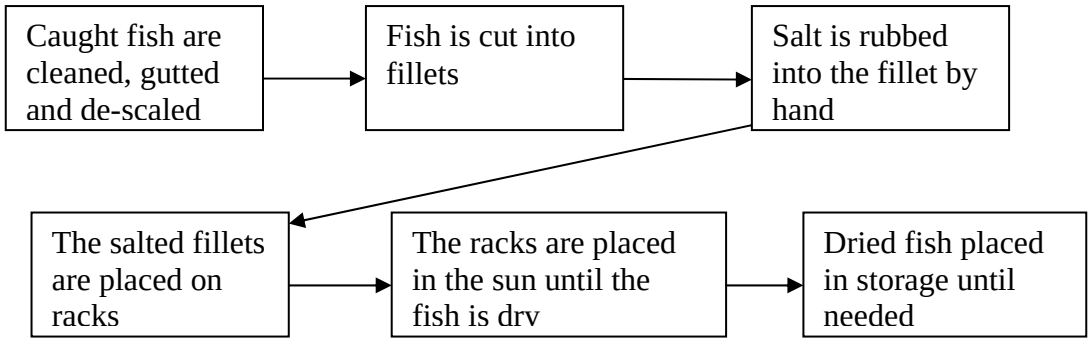
a. List 4 factors that cause food to deteriorate. (½ each) [2]
Bacteria; moulds; fungi; oxygen; insects; rodents; enzymes; etc

b. Suggest four processes which can prevent bacteria from spoiling food. [4]
Remove moisture; remove oxygen; irradiate; use preservatives; lower the temperature (3^oC or lower); canning – use saturated sugar solution+heat

c. Suggest two processes which can prevent oxygen from spoiling food. [2]
Vacuum packing; surround by inert gas e.g. CO_2; nitrogen

d. Choose one process from Mind Map 3 and develop a **flow chart** to describe the process fully. [6]

Use your professional judgement to evaluate the flow chart. Here is a simple example: Drying fish



More formal flow charts are welcome

e. How does lack of access to electricity impact on a family's ability to buy food? [4]
No electricity so no fridge, no freezer SO they must buy food daily, cannot buy in bulk, cannot take advantage of special offers, have to travel to shops daily; have to carry cash which could be a security issue, cannot keep left-overs .....

Task 2

Minute 30 | ✓Marks 22

INDIGENOUS TECHNOLOGIES: INVESTIGATING THE NGUNI GRAIN PIT
{Acknowledgement: Adapted from *Viva Technology Gr9, Vivlia Publishers - 2006*}

LEARNING OUTCOMES AND ASSESSMENT STANDARDS ADDRESSED:

Lo1:	**Technological Processes and Skills**
AS:	Investigates
	Analyse existing products relevant to an identified problem (food preserving) based on safety and storage method.
	Communicates
	Presents ideas using Systems Diagrams
Lo3	**Technology, Society and environment**
AS	Indigenous Technology and Culture
	Explores compares and explains how different cultures in different parts of the world have effectively adapted technological solutions for optimum usefulness.
	Impact of Technology
	Recognises and identifies the impact of technological development on the quality of people's lives and on the environment in which they live.

Learners will be assessed on the following:

- Knowledge of indigenous storage methods and modern adaptations
- Ability to represent the storage systems using systems diagrams.
- Ability to compare appropriate technologies for specific purposes.

The case study focuses on an Nguni solution to grain storage. Schools in other provinces may add references to local practices but the protective role of the CO_2 gas generated in the grain pit is unique and needed to answer some of the questions. This integrates Technology with Natural Sciences. The success of indigenous preservation techniques is used to counteract bias towards rural, indigenous technologies. The link between the grain pit and the modern silo in Question c shows how indigenous techniques can impact on modern practice.

The section comparing subsistence processing techniques with those used by commercial farms is intended to highlight the correctness of using a solution **appropriate** to the task. It makes no sense for a subsistence farmer to buy and operate expensive machinery to process a small crop, and it makes no sense for a commercial farmer to try to process large crop yields by hand. This does not make one better than the other. Small farmers should utilise labour intensive techniques while commercial farmers should lean towards mechanisation. Discuss this suggestion with your learners. Remember, that currently South Africa has many unemployed people.

PTO

Activity 2.1
QUESTIONS

a.	Explain the role CO_2 gas against insect and rodent attack	[2]
Once the pit is filled with CO_2, a heavy inert gas, all oxygen has been pushed up out of the pit. No aerobic bacteria (micro-organisms), nor any fungi, moulds, insects and rodents, can survive in the protective atmosphere. ✓✓✓		
b.	Since CO_2 is a non-poisonous gas, why is it dangerous to lower a child into the pit to retrieve grain as soon as it is opened?	[2]
Although CO_2 gas is not poisonous, there is no oxygen to breathe (respiration) in the pit. The child will not die from the presence of the CO_2 gas, but will suffocate due to a lack of oxygen. ✓✓✓		
c.	This indigenous technology is very appropriate for small subsistence storage systems. How can CO_2 be introduced to prevent damage in modern commercial grain silos like the one pictured below? See learners Book	[3]

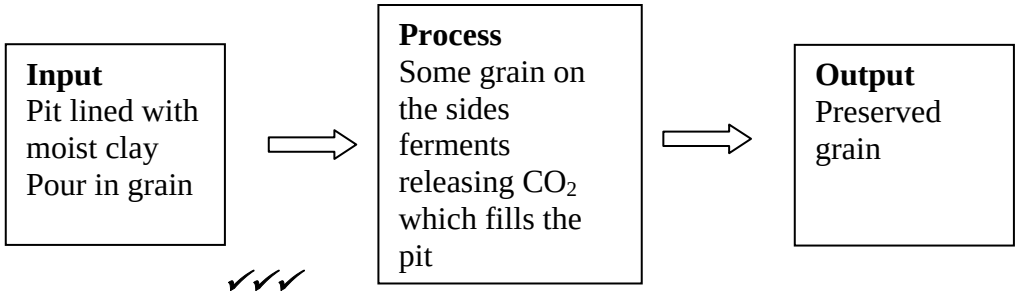
STEPS: *1. Seal the bottom of the silo* ✓
2. Place a block of dry ice on top of the grain (see valid alternatives below) ✓
3. The silo soon fills with CO_2 ✓

Explanation
Since CO_2 is a heavy gas, if it is pumped into the silo, it will not rise out of the top. If the silo is sealed at the bottom, any CO_2 introduced will stay there, protecting the grain from micro-organisms and other threats. A simple way to introduce CO_2 into a silo is to place a block of dry ice (solid CO_2) on top of the grain. As the dry ice sublimes to form the heavy gas, it will sink down through the grain, displacing the air upwards and out. Soon the silo contains only the protective CO_2 gas.

OR *you could empty a CO_2 fire extinguisher into the top*
OR *you could moisten some grain causing fermentation which will generate CO_2 gas.*

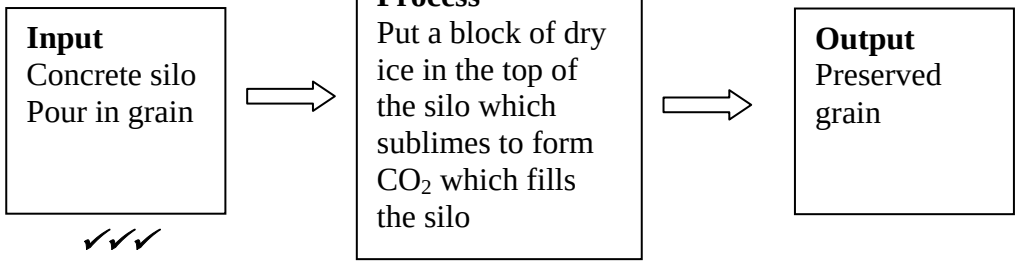
d.	Develop systems diagrams 1. To represent the indigenous preservation system used by the Nguni people 2. To represent the more modern preservation system you suggested in c.	 [3] [3]

1.



✓✓✓

2.



✓✓✓

e. Write a short explanation saying why this method of processing is appropriate for subsistence farming. [2]

Subsistence farming produces food for the table with little or no excess for sale. It makes no sense to use expensive machinery to process a few rows of mielies or other crops. Machinery also would need expensive fuel to power it. ✓✓✓

OR Alternative Valid Answer

This method is cost efficient using human power and naturally obtainable resources only. The process can manage the quantities that a subsistence family need. The product is natural, unrefined and pure without additives. The proteins in the husk is used to produce mageu and mqomboti (sorghum beer) ✓✓✓

f. Why are the methods not appropriate for commercial farming production systems? [2]

Sample answer

Manual labour is too slow for large scale production ✓
It is more expensive than operating machinery ✓
Crops are seasonal – labour needs to be employed all year ✓

Deeper issues

Such labour intensive practises are too slow and inefficient for processing a crop measuring thousands of tonnes. For labour to be exposed to the elements on huge fields is physically exhausting. Since women are often used as unskilled farm labour, gender bias is also an issue here. Labour is also required only seasonally and needs to be housed and fed during the off-season. Machines can stand idle in a barn.
Use this opportunity to discuss gender bias and related issues.

g. Suggest a more appropriate system for commercial scale grain processing. [3]
See LG for pictures

It is economically sensible to use machinery for large scale production – it can work 24 hours per day (with relief drivers), is efficient is properly maintained, and cheaper than a large labour force which will be idle during the off-season.
The picture show a combine harvester picking and threshing the crop. A hammer mill can do the work of the lady with a mortar & pestle and a mill will duplicate the work of the lady using the grinding stones. ✓✓✓✓

Mortar & pestle
(Tshivenda: musi na mutuli);)
Grinding stones
(Tshivenda: lwala na bwani; (Isixhosa: imbokhodo)

h. What impact does modern processing methods have on the quality of highly refined food? .e.g. flour. [2]

Highly refined foods e.g. white sugar, white bread; generally have a lower nutritional value than less refined foods ✓✓

Deeper issues

Excessive processing can remove vitamins and minerals, so can excessive exposure to heat, ultraviolet rays, etc

Task 3

Minutes *60*

Marks 29

Case Study and Resource Task – Indigenous Technology Sun–dried Morogo

{Acknowledgement: Adapted from *Viva Technology Gr9, Vivlia Publishers - 2006*}

LEARNING OUTCOMES AND ASSESSMENT STANDARDS ADDRESSED:

Lo1:	**Technological Processes and Skills**
AS	Investigates
	Analyse existing products relevant to an identified problem (food preserving).
	Makes
	Learners cook and dry morogo
	Evaluates (subjective) and Communicates
	Learners evaluate taste, texture and quality of the dried product and report
Lo 2	**Technological Knowledge and Understanding**
AS	Processing
	How *morogo* can be processed to change or improve properties (life-span)
Lo 3	**Technology, Society and Environment**
AS	Indigenous Technology and Culture
	Explores compares and explains how different cultures in different parts of the world have effectively adapted technological solutions for optimum usefulness.
	Impact of Technology - an appropriate preservation technique
	Recognises and identifies the impact of technological development on the quality of people's lives and on the environment in which they live.

Learners will be assessed on the following:

- Knowledge of indigenous preservation methods
- Ability to cook, dry and evaluate morogo

Background

Morogo rich in iron, grows wild but can also be cultivated at home. One should be wary when picking and eating any food that grows wild.

- Ability to complete a Worksheet and to calculate costs and profit margins.

This is intended as a practical activity. Organise your learners into their teams.

Teams will...

- Cook and dry, then rehydrate heat and evaluate one type of morogo (e.g. thepe).
- Dry another type (e.g. lephotsi - pumpkin leaves) between sheets of paper. This must later be rehydrated and then cooked and evaluated.

Cooking should preferably be done at school. This will be possible even where no "Consumer Studies" centre exists since an open fire and a jam tin "pot" will suffice. Learners must cook morogo (or bought spinach if you can't get wild spinach). Then they must dry spoon-sized servings on a sunny rock and/or sheet of corrugated iron set at a

slope. Some days later, they collect their dried morogo and store until they are ready for the evaluation session. The other type is dried between sheets of paper and stored prior to being needed.

The dried morogo is rehydrated and tested against criteria given in the worksheet.

This activity shows learners that food preservation is a universal practice. Prior to modern high technological solutions, all people had to develop methods of extending the life-span of their foodstuffs. The Voortrekkers developed biltong, the Indians used curries, the Cape Malay people salted snoek and bokkoms, the Venda and Shangaan people dried mopane worms (mashonzha), and many groups dry morogo, even to this day and age.

The purpose of this activity is to allow learners to experience the effectiveness of drying morogo thereby developing an appreciation for a very successful indigenous practice, which should increase their respect for other indigenous knowledge systems. Doing the activity practically exercises team dynamics, as well as allowing the learners to participate in a cultural activity which will form a bridge between cultures leading to better understanding.

Furthermore, this technique is an effective way of using food resources economically and sustainably.

Activity 3.1: Practical Evaluation – Drying and Testing Morogo

Time: extended: Cook...Dry...Test {30} Marks: 19 Teamwork

Learners must obtain some morogo – you can pick wild morogo or even buy some from some supermarkets or vendors, or buy ordinary spinach if you can't get morogo.

Keep learners in their original teams – evaluated them using the rubric on page 5 for their effectiveness as a member of a team. [**7 marks**]

- **Cook** one batch **and dry** it on rocks or on a sheet of corrugated iron.
- **Dry** another batch without cooking between two sheets of paper.
- After two weeks, they **rehydrate** the samples as described on the previous page and
- **Evaluate** them using the table below:

Learners must consider issues of safety

Learner tool - Morogo Test		Rating Scale		
Sample	**Drying Method**	**Taste**	**Texture**	**Quality**
A	Precooked then dried on rock or corrugated iron			
B	Uncooked then dried between newspaper			

Rating Scale: Taste: 1 = horrible, 2 = tasteless, 3 = palatable
Texture: 1 = tough, 2 = slimy, 3 = chewy
Quality: 1 = low, 2 = acceptable, 3 = good

There are no wrong answers here since the tests are subjective and a matter of opinion. Encourage the learners to be honest and perform the tests in a serious manner.

Use the scale below to rate them according to how they perform the above tasks.

Rating Scale Food Quality Test Teacher Assessment Mode: Team

Preparation of samples for drying	1	2	3
Drying of the samples	1	2	3

Rehydrating of samples	1	2	3
Evaluating samples in terms of taste, texture and quality	1	2	3
Maximum	**12**		

Once they have started Activity 3.1 they should proceed with Activity 3.2 – the Worksheet. Tell them that they do not have to wait until 3.1 is completed.

Activity 3.2: Drying Morogo Worksheet

Time: 30 minutes **Marks: 10** **Pair work**

Divide your learners into focus groups of four. They must discuss these three questions

- How appropriate are these methods for the people using them?
- Is newspaper safe?
- What would be a better alternative than newspaper?

Now divide the focus groups into pairs. Partners follow the next instruction.

Pair work: Work with a partner to complete the WORKSHEET on the next page.
Fill in one worksheet per pair, and submit it for marking. This reduces your marking load.

Both members of the pair must be credited with the same mark and must have a ***copy*** of the worksheet in his/her answer book.
If one learner has a better handwriting than the other, mark that worksheet.

WORKSHEET Dried foods
Pair work

NAMES: ***PTO for Memo***

1. Name two different varieties of morogo (wild spinach) used by people?
…… and …… [2]

2. Explain how to dry precooked morogo?
…….... [2]

3. Fresh morogo is dried between sheets of newspaper. Is newspaper safe? ……
Please give a reason for your response?
……..……..... [1 + 2]

4. What do you think would be a more suitable form of paper to use for the drying of morogo?
……..……[1]

5. How is the dried morogo stored?
.....[2]..

Investigating Cost
Dehydrated foods lose water and weigh less than fresh foods.

6. If biltong loses 60% of its original mass as it dries, what will be a reasonable selling price for a kilogram of biltong if you bought the fresh meat at R30 per kilogram? You can make a profit of 30% on the transaction.

(a) Calculate the "break-even" price:

.....[6]

(b) Now add a profit of 30%:

.....[4]

Total: 20 {20÷2=10 marks}

WORKSHEET Dried foods

Pair work

NAMES: ***MEMORANDUM***

1. Name two different varieties of morogo (wild spinach) used by people?
Any two of: *lerotho* or *thepe or* lephotsi or murudwi etc [2]

2. Explain how to dry precooked morogo?
Once cooked, spoonfuls or handful are placed either on flat rocks or on sheets of corrugated iron. The water drains away and the morogo dries (dehydrates) in the sun. Once dried, the morogo is stored in baskets or similar receptacles until needed. [2]

3. Fresh morogo is dried between sheets of newspaper. Is newspaper safe?
Please give a reason for your response?
NO [1] *Printers ink is poisonous* [2]

4. What do you think would be a more suitable form of paper to use for the drying of morogo?
Blank newsprint or flip chart paper or brown paper [1]

5. How is the dried morogo stored?

Dried morogo is stored in
grass baskets, or orange bags, or similar well-ventilated receptacles until needed [2]

Investigating Cost

6. Dehydrated foods lose water and weigh less than fresh foods.

If biltong loses 60% of its original mass as it dries, what will be a reasonable selling price for a kilogram of biltong if you bought the fresh meat at R30 per kilogram? You can make a profit of 30% on the transaction.

a> Calculate the "break-even" price:

1kg WET = 400g Meat + 600g Moisture so out of R30/kg, only R12 is for meat and R18 for moisture
1kg DRY Biltong = 400g x 2,5 = 1kg
*so R30 x 2,5 = **R75** ..... this is the break-even price* [6]

b> Now add a profit of 30%:

R75/kg raised by 30%: 30% of R75 = 0.3x7,5 = R22.50
*So, the selling price should be: R75 + R22.50 = **R97.50*** [4]

Total: 20 {20÷2=10 marks}

Note: If a is incorrect, b must be calculated using the value of a and so the answer may be different from the memo and still score full marks for this step.

If you need help, discuss this with your EMS and Maths colleagues.

Task 4

Minute 55 | ✓ Marks 20

LEARNING OUTCOMES AND ASSESSMENT STANDARDS ADDRESSED:
{Acknowledgement: Adapted from *Viva Technology Gr9, Vivlia Publishers - 2006*}

Lo1	**Technological Processes and Skills**
AS	Design [environment]
	Where the product will be used or made, impact on the environment in the long and short term
Lo 3	**Technology, Society and Environment**
AS	Indigenous Technology and Culture
	Explains how different cultures have effectively adapted technological solutions for optimal usefulness
AS	Impact of Technology
	Recognises and identifies the impact of technological development on the quality of people's lives and on the environment in which they live.
AS	Bias in Technology
	Strategies to redress past exploitation of indigenous knowledge systems will be assessed.

Indigenous Technologies – the Hoodia story

This task is rich with opportunities to engage with Human rights, social justice, inclusivity and a healthy, sustainable environment

Using the Case study on the intellectual capital of the San People, learners are sensitised to the dangers of exploitation. At the same time, learners see that indigenous knowledge systems are valuable and may be over utilised. The sustainable use of resources is highlighted and the moral need to respect and reward people for their knowledge.

Activity 4.1: Class discussion & Team report – Hoodia: Indigenous Knowledge and Resource Management

Time: extended: 20 minutes **Marks: 6** **Teamwork**

This task...

- Promotes group and team work
- Promotes understanding of cultural and environmental issues
- Promotes inter-group respect and is a "value-adding exercise"
- Highlights local indigenous solutions
- Highlights the role players and their responsibilities to the environment, to cultura heritage rights, and to future generations
- Sustainable use of resources

Collective ownership of the final product is achieved as they generate a team report to meet specific criteria – including participation.

The next two activities encapsulate the foregoing concepts providing learners with opportunities to demonstrate their understanding of the environment issues related to

uncontrolled processing of natural resources, and to the unfair exploitation of indigenous knowledge systems by business interests

All team members may be awarded the same marks unless a learner does not do his/her fair share. Use your professional judgement in such cases.

Rating Scale **Class Report** **Teacher Assessment** **Mode: Team**

Introduction	1	2		
Key issues discussed	1	2	3	4
Suggestions	1	2	3	4
Conclusion	1	2		
Maximum	**12 ÷ 2 = 6**			

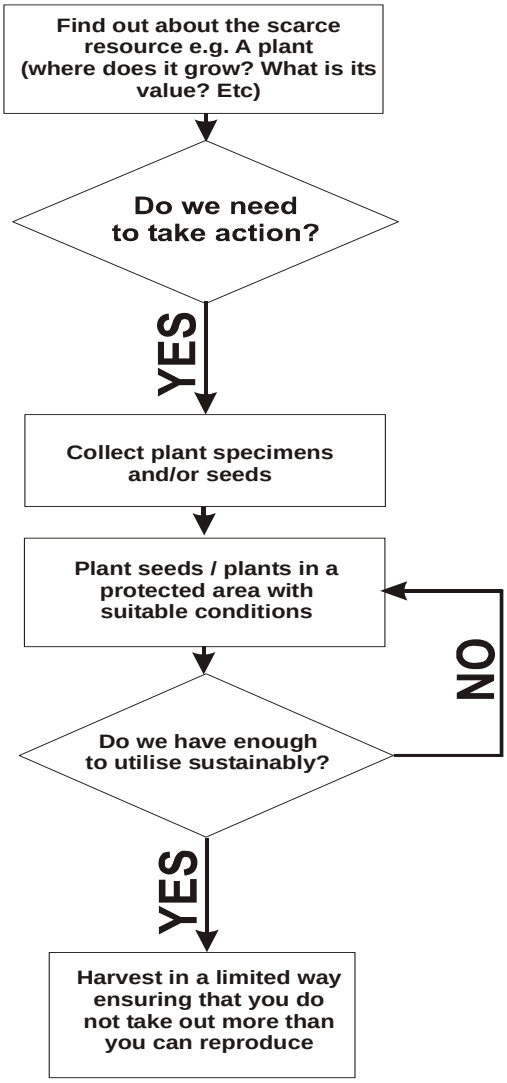
Activity 4.2: Flow Chart: Sustainable Resources Management

Time: 20 minutes **Marks: 7** **Individual Work**

Lo1, AS - Makes
Learners develop a flow chart outlining how scarce resources can be utilised in a sustainable way to prevent their becoming extinct.

You may guide learners by showing an example of a flow chart if you have not previously met this part of the "makes" Assessment Standard – page 41, bullet 3 of NCS Grade R-9.

This example shows how a suitable answer may look. You will need to use your professional judgement in awarding the seven marks allowed here. Additional information, perhaps relating to royalty payments or similar issues, may be added by stronger learners.



PTO for the Assessment Tool

Flow Chart Rubric **Teacher Assessment** **MODE: Individual**

CODE	Level Descriptor:
4 ✓✓✓✓ ✓✓✓	Develops a plan for using indigenous plants sustainably and represents the key stages on a flow chart **and** has alternative strategies if an area exhausts local resources e.g. establishing a nursery
3 ✓✓✓✓	Develops a plan for using indigenous plants sustainably and represents the key stages on a simple flow chart, **but** has no alternative suggestions if an area over utilises local resources.
2 ✓✓	Is able to list some steps for a plan to use indigenous plants sustainably **but** has no idea of how to represent it on a flow chart.
1 (0)	Unable to formulate an action plan to use indigenous plants sustainably.

If a learner has met the descriptor rated CODE 4, you may use your professional judgement to award the mark somewhere between 5 and 7 according to the specific learner's quality of planning and flow charting.

Activity 4.3: Report – Ethical Research Practises

Time: 15 minutes **Marks: 7** **Teamwork**

After discussing how multinational drug companies should recognise and reward their sources, each team must prepare a joint report to be presented to the class by a selected spokesperson (3 minutes).

Activities which are sequential include waiting time for the team's turn – this is not counted into the contact time for the activity.

Use the rubrics below to rate the performance of the teams and their spokesperson. Learners who hardly contribute do not get the same marks as more productive learners. However, do not reward learners who dominate all proceedings to the exclusion of others who are willing to contribute. Use your professional judgement to determine the marks of individuals within groups.

The marks from the two rubrics must be combined and then divided in half.

Rubric: Report Preparation
Teacher Assessment **MODE: Team {7/2=3,5}**

CODE	Level descriptor
7	All team members assisted the spokesperson prepare their report, they made **aids**, and **assisted** during the delivery of the talk.
6	All team members assisted the spokesperson prepare their report, they made **visual aids**, but **did not assist** during the delivery of the talk.
5	***All*** *team members assisted the spokesperson* ***equally*** *in preparing their report*
4	***All*** *team members assisted the spokesperson prepare their report.*
3	***Most*** *team members assisted the spokesperson prepare their report.*
2	**Some** team members assisted the spokesperson prepare their report.
1	No one helped the spokesperson prepare the team's report.

AND also use the next rubric overleaf:

Rubric: Report Presentation

Teacher Assessment **MODE: Team Representative {7/2=3,5}**

CODE	Level descriptor
7	The spokesperson was well prepared, was able to give an excellent clear report, had good notes and gave three examples of unethical behaviour.
6	The spokesperson was well prepared, was able to give a very clear report, had some notes and gave three examples of unethical behaviour.
5	The spokesperson was well prepared, was able to give a very clear report, had some notes and gave two examples of unethical behaviour.
4	*The spokesperson was well prepared, was able to give a clear report, and gave two examples of unethical behaviour.*
3	*The spokesperson was well prepared, was able to give a clear report, and gave one example of unethical behaviour.*
2	The spokesperson was badly prepared, but was able to give a clear report, but did not refer to the theft of indigenous knowledge.
1	The spokesperson was badly prepared, unable to give a clear report, and did not refer to the theft of indigenous knowledge.

Expanded Opportunity Not part of time allocation Marks [4]

An Optional research task for motivated learners:

Here is an opportunity for learners to gain bonus marks.
Learners, who have not achieved at the level they would have liked, can use this extra opportunity to earn **additional marks** to improve their overall rating. This will be marked on an individual basis for deserving cases according to the professional judgement of the teacher. *This is similar to workers earning extra money by working overtime*.

Guide your learners to consider the Hoodia case study so that they can respond meaningfully to this issue:

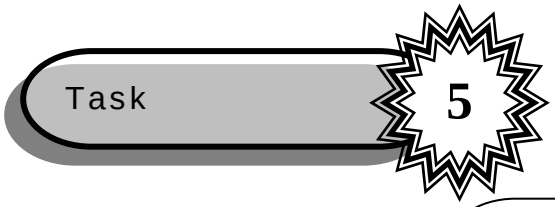
Many other indigenous plants grow wild in South Africa and are collected and sold without anyone giving any thought to whether this practise is sustainable.

Some ancient remedies have been adopted and improved by modern medical technology Choose one of the following items and find out what is its role in medicine.

1. **Quinine** from the bark of the cinchona tree OR
2. **Aspirin** from the bark of the willow tree OR
3. The analgesic properties of the **acacia mimosa** thorn tree OR
4. The analgesic properties of the **feverfew** daisy.

List...

- Where it is found in the world?
- What is its use?
- How modern medicine found out about it?
- How it is processed into a medicine?



Minutes 65

✓ Marks 40

LEARNING OUTCOMES AND ASSESSMENT STANDARDS ADDRESSED

Lo 1	**Technological Processes and Skills**
AS	By the end of Gr9, learners must be able to ***identify and explain a problem***, need or opportunity from a given real-life context, and to ***investigate*** the context, ***the nature of the need***, ***the environmental situation***, and the people concerned.
AS	Develops and **performs practical testing procedures to** determine or **compare the suitability or fitness-for-purpose of relevant properties of materials**...
Lo 3	**Technology, Society and Environment**
AS	Impact of Technology
	Recognises and identifies the impact of technological development on the quality of people's lives and on the environment in which they live.

At the end of Task 5, the learners should have realised that...

- Plastics are valuable, but that they are produced from non-renewable resources.
- Discarding plastics causes severe pollution because few are bio-degradable.
- The solution to these two problems lies in recycling.

Each school has been supplied with an extract from the pamphlet entitled "It's All About Plastics - Material of Choice" from the Plastics Federation of South Africa.

Activity 5.1: The Origin of plastics AND Classes of plastics

Time: 10 minutes **Marks: 10** **Teamwork**

Teachers need to bring information about plastics to the class for this section.
We recommend the well-known pamphlet "It's All about Plastics– Material of Choice" obtainable from the Plastics Federation – key extracts from this are in the learner's Guide

Each team of learners produces one response for marking. Once it has been marked, each team member places a copy in his/her CTA Portfolio. Ensure that any CTA scrutinised for moderation purposes contains evidence of learner performance that has been marked.

a) Learners use the supplied extract and any other resources you may have available to find out:

- Where raw materials for plastics come from internationally **[2]**

[***petrochemical sources e.g. oil, natural gas (ethylene or propylene) or coal***]

- Where raw materials plastics come from locally

[*low grade coal*], *more* *recently we have switched over to ethylene (ethene) gas which is piped to Secunda from Xai-xai in Mozambique* **[2]**

b) All plastics fall into one of two classes, namely **Thermoplastics** and **Thermosets.**

- Use the extract to find an explanation of these two classes.
- Write down the differences between them and list two examples of objects made using each class of plastic.

Thermoplastics:
These plastics can be softened by heating and will harden again on cooling
e.g*. any two from*
PET (1) to PS (6) and associated examples, like PET used for cooldrink bottles; Plasticised PVC used for plastic bags, electric wire insulation, hosepipes; Rigid PVC used for pipes and gutters, etc **[3]**

Thermosets:
These plastics are hardened by heating and cannot be softened again by further heating *e.g. any two from*
Urea formaldehyde – used for light coloured electric fittings e.g. light switch
Melamine formaldehyde – used for tableware, electric insulators.
Phenol formaldehyde – used for dark coloured electric fittings and for saucepan handles, plastic bottle tops **[3]**

Activity 5.2: Types of plastics AND their uses – TEAM DISPLAY

Time: 10 minutes **Marks: 10** **Team Work**

Teams need to prepare their displays before class. The 10 minutes allocated here is only for setting up the display for assessment purposes.

A special system of identifying plastic is used worldwide to identify packaging plastics. It is called the Polymer Identification Coding System. It was introduced in 1998 at the request of recyclers because many plastics look alike, making it difficult to sort for recycling purposes.
A **Polymer Identifying Logo** is put on the product – with bottles it is usually on the base. The number in the triangle denotes the type of plastic (polymer) used. Refer to pages 3 and 4 in the extract from the "It's All bout Plastics" Pamphlet.

Different types of plastics have slightly different properties, which makes them have different uses.

1. **PET** - cooldrink bottles, washing liquid bottles, preserved fruit containers
2. **PE-HD** - milk bottles, motor oil containers, buckets, crates and bags
3. **PVC** - clear trays for foods and toiletries, clear bottles, pipes, gutters
4. **PE-LD** - frozen vegetable bags, garbage bags, building film, soft squeeze bottles
5. **PP** - bottle caps, automotive battery cases, cups and plates
6. **PS** - HD or Crystal Polystyrene .....e.g. CD Cases
   - HIPS or High Impact Polystyrene .....e.g. TV cabinets, monitor cabinets
   LD or Expanded Polystyrene .....e.g. Disposable plates and cups, yogurt containers, takeaway food trays
7. **Other** - mainly specialised plastics for various engineering purposes.

<u>What learners must do</u>: Teams of learners must collect at least two examples of the six types of packaging plastics. Remind each team to ensure that they have a full set, representing examples of all six of the packaging plastics. These samples should be collected before the start of the activity. Collecting time is not part of the Activity time. Teams display their samples – displays must be labelled. [3]

Instruct the teams...

- **To set up a display showing their samples**
- **To identify what each type of plastic can be used for, and**
- **To be sure to label all relevant information in their display.**

Assessment: Plastics Display
Teacher Assessment **MODE: Team** **Rating Scale**

Display contains examples of all six types of plastic	1	**2**	
Overall Appearance of Display	1	**2**	
Information contained in the display	1	2	**3**
Uses of each type of plastic beyond those given above	1	2	**3**
Maximum			**10**

Activity 5.3: Identifying Plastics: Practical Test

Time: 20 minutes **Marks: 12** **Team Work**

Instruct the learners to bring their previously collected different types of scrap plastic. The graphic in the Learner Book shows some common items made of different plastics, but there are others like plastic bags and food containers. They are free to collect any range of plastics.

Make sure that they include a CD Case (High Density Polystyrene) and a Styrofoam food tray (Low Density or Expanded Polystyrene).
They may, of course use some of the samples collected for Activity 5.2

Many plastic items do not carry the Polymer Identifying Logo.
This activity shows learners how to identify them so that they can be recycled effectively. Learners perform the tests listed in the Learner Book and check the properties given on the table. They will need the following equipment:

A sharp knife, a hammer (a round rock will also work), a basin of water, a flame (e.g. spirit burner / Bunsen burner / Cadac gas stove / cigarette lighter .... **do not use candles or paraffin** because they affect the flame colour and smell tests) Cigarette lighters work well in this activity.

They must test the CD Case and the Styrofoam food tray at the same time. This will allow them to compare the results of the flame tests (colour / smoke) to verify that they are chemically the same, even though their physical properties differ.

It is strongly advised that the facilitator performs the tests on one or two samples before running this practical. This will give you a feeling for how this task will progress, what the potential pitfalls are, and will help you to avoid dangerous situations before they arise. You may consider using one team of motivated learners to assist you in this pre-test.

Steps:

1. Learners perform the tests listed in the Learner Books on page 27 on one of the samples and verify its characteristics against the Table on the same page.
2. They then test the Styrofoam and the CD case to show that they are chemically the same by comparing the flame tests (colour / smoke) to verify that although their properties physical differ, they are chemically the same.

Expanded Opportunity
Motivated learners may test the other samples to earn additional bonus marks {max=4}

Here is the Assessment Tool to evaluate learner performance:

ASSESSMENT : Rating Scale

Descriptor: The team...	**1**	**2**	**3**
Performed the tests in an **organised, safe and disciplined** manner			
Identified the properties /characteristics correctly			
Identified the type of plastic correctly			
Tested that Styrofoam sample and CD case are chemically similar			

[12]

Activity 5.4: Problem Identification and Generating a Solution

Time: 20 minutes Marks: 8 Individual Work

LEARNING OUTCOMES AND ASSESSMENT STANDARDS ADDRESSED

Lo 1	**Technological Processes and Skills**
AS	Learners identify a problem, need or opportunity from a given context

This activity is designed to provide learners with the opportunity to identify a problem. Now that they have been working on plastics they should have developed some understanding of waste. Focus their attention on the school and find out if they can:
1. Identify a problem related to waste, and 2. Suggest a solution.

Clearly the 2nd point relies on their achieving the 1st.

First determine whether they can respond correctly to number 1. Those who cannot respond properly will receive zero credit for this. Then discuss the question with the class **before** giving them number 2. Learners who did not identify the problem must be assisted so that they all have a fair chance to attempt the remaining questions.

1. Now that you have learnt about plastics and read extracts from the "It's All about Plastics" pamphlet, can you identify a problem, need or opportunity, within this context, that exists in your school environment?

Possible answers:

In our school a lot of recyclable materials (like plastics, paper and metal can) are discarded and sometimes, even burnt. This adds to global warming and amounts to burning potential money. [2]

2. Develop a proposal that will assist with solving the problem you identified above.

I propose to set up a recycling centre where these waste products can be sorted and then stored until there is enough to be collected by a recycling company. This will generate Funds which can be used to improve the school/assist needy learners, etc. [2]

Irrespective of the various proposals put forward, all learners must be given the same instructions for 3 and 4. The process now becomes teamwork.

3. They design a recycling collection centre where learners, as well as parents and local residents, can bring items for recycling. The centre must have sorting and storage areas. It should be aesthetically pleasing, and must not be able to be affected by high winds.
4. Learners produce a neat sketch **showing 3 views with dimensions** of the final design with the necessary labels and notes.

Rubric: Sketch Plan

Teacher Assessment **MODE: Individual**

CODE	Level descriptor:
4	The view is **complete, neatly drawn**, with required sections**,** and contains **comprehensive, clear** explanatory notes.
3	The view is **complete,** it is **tidy**, with **all** required sections**, and a few** notes are attempted.
2	The view is **nearly complete** and it is **tidy**, with **most** required sections.
1	The view is **far from complete** and untidy.

GLOSSARY

Words	Meaning
Royalties	Sum paid for work done, something sold
Plagiarism	Using another one's thought or writing without acknowledging
Deterioration	Becoming worse
Nguni Grain Pit	An ancient practice used for storage of grain – modern ways silo
Sangomas	Fortune teller, healer
Sustainability	Keep for a longer period
Ethical	Human conduct, relating to morals
Symptomatic	Aspect of physical or mental conditions
Nausea	Vomiting, unsettled stomach
Antibiotics	Substance capable of destroying any foreign bodies
Thrush	Fungal infection of throat in children or vagina
Diarrhoea	Condition of excessive frequent and loose of bowel movement
Chronic	Constant, never ending disease
Analgesic	Pain reliever, pain killer