



education

Department of Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL CURRICULUM STATEMENT
GRADES 10-12**

**SUBJECT:
CIVIL TECHNOLOGY**

**TEACHER TRAINING MANUAL
2006**

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PROGRAMME

PERIOD: Monday to Friday

DURATION: 36-37 hours

5-DAY PROGRAMME FOR TEACHERS-

SESSION	ACTIVITY	TIME	DAY
1. Introducing the National Curriculum Statement (NCS) and the National Senior Certificate (NSC)	Introduction of training participants	3-4 hours	Mon AM
	Overview of the week of training / documents provided		
	Introduction to the NCS and NSC		
2. Introducing the Subject Statement	Introduction: Overview	20 hours	Mon PM – Wed PM
	2.1 What is new? Audit		
	2.2 Content and competencies		
	2.3 Integration of Learning Outcomes and Assessment Standards		
	2.4 What SKVs are imparted		
	Implications for teaching and learning		
	2.6 Implications for assessment		
	2.7 Designing Civil Technology questions		
	2.8 Cognitive skills		
	2.9 Designing a Performance Assessment Task		
Conclusion / Wrap-up			
3. Planning for teaching subjects in the NCS	The Planning Cycle	8 hours	Thurs
	The Grade 11 Work Schedule		
	Critique of the Grade 11 Work Schedule		
	Development of the first Lesson Plan for Grade 11		
4. Annual assessment plan	Introduction	5 hours	Fri AM
	Annual assessment plan		
	Conclusion / Wrap-up		

**SESSION 1 –
Introducing the National Curriculum Statement (NCS) and the National Senior
Certificate (NSC) (3-4 hours)**

ACTIVITY 1: Introduction of training participants

FORM OF ACTIVITY: Introductions

ACTIVITY 2: Overview of the week of training / documents provided

FORM OF ACTIVITY: Presentation

RESOURCES: The 5-day training programme (PowerPoint)
A hard copy of each document referred to-

- National Senior Certificate Policy
- Subject Statement
- Subject Assessment Guidelines
- Learning Programme Guidelines
- Teacher Guide – only applicable to Mathematical Literacy and Life Orientation
- National Protocol on Assessment
- Higher Education admission requirements

CONTENT:

- Training programme for the week and house rules
- Documents making up the National Curriculum Statement policy and documents supporting the National Curriculum Statement policy – purpose and status of each

ACTIVITY 3: Introduction to the NCS and NSC

Part 1: 20 Questions

FORM OF ACTIVITY: Test and discussion

RESOURCES: PowerPoint Presentation, Laptop, and Data Projector

CONTENT:

- 20 questions focusing on the NCS and NSC

INSTRUCTIONS:

- Allow the participants to record their responses to each question as individuals
- Discuss the answers with the group as a whole, inviting participants to offer answers before discussing them

Part 2: **NCS and NSC**

FORM OF ACTIVITY: Presentation and discussion

RESOURCES: PowerPoint Presentation, Laptop, Data Projector, a hard copy of each document referred to in the presentation-

- National Senior Certificate Policy
- Subject Statement
- Subject Assessment Guidelines
- Learning Programme Guidelines
- National Protocol on Assessment

CONTENT:

- Overview of the NCS, including principles and Critical and Developmental Outcomes
- National Senior Certificate: Requirements, structure and details

Part 3: **Requirements for Higher Education study**

FORM OF ACTIVITY: Open-book and presentation

RESOURCES: PowerPoint Presentation, Laptop, Data Projector, HE admission requirements

CONTENT:

- Requirements for certificate, diploma and degree programmes

INSTRUCTIONS:

Introduction

- While the Higher Education document is not part of NCS policy, it provides teachers with indicators on required learner performance in NCS subjects for entry into Higher Education
- The 3-year NSC programme is the key to Higher Education study and teachers need to be aware of the admission requirements for different programmes offered at Higher Education Institutions

Open-book activity

- Ask participants to study the HE document and identify the requirements for certificate, diploma and degree programmes

Report back and discussion

- Allow one report back
- Present the requirements (see PowerPoint Presentation)
- Discuss the designated list of subjects, noting that learners already have 3 of the designated subjects in their NSC package – two languages and Mathematics or Mathematical Literacy

**SESSION 2 –
Introducing the Subject Statement (20 hours)**

INTRODUCTION

INTRODUCTION	OVERVIEW OF CIVIL TECHNOLOGY INTEGRATION ACROSS LEARNING OUTCOMES
ENGAGEMENT:	PowerPoint Presentation
TIME ALLOCATION:	1 hr
RESOURCES:	PowerPoint Presentation, Laptop, Data Projector, Subject Statement,

Introduction:

- Overview of the subject: Definition, purpose and scope of the subject – its origin
- Learning Outcomes for the subject.
- Mention of supporting policies relevant to the subject and how they support the implementation of the subject CIVIL TECHNOLOGY (do not engage in them)
- Time allocation and placement of CIVIL TECHNOLOGY in the school timetable. To be discussed in the activity on IMPLICATIONS FOR LEARNING, TEACHING AND ASSESSMENT.

**SUBJECT CONTENT AND APPROACH TO TEACHING, LEARNING AND
ASSESSING**

Activity 1	What content is new – i.e. which content is unknown to you? (Knowledge gaps: Civil Technology Grades 10, 11 and 12)
ENGAGEMENT:	Participants will identify any knowledge and skills gaps within the subject which they might have and for which they need further training.
TIME ALLOCATION:	60 minutes
RESOURCES:	Check list (Annexure A)

INSTRUCTIONS:

- The facilitator hands out a checklist which includes suggested concepts and content required to achieve the Learning Outcomes of Civil Technology
- The aim of the checklist is to identify any knowledge and skills gaps within the subject which you might have and for which you need further training.
- Each participant must complete the checklist and hand it to the facilitator who will make a duplicate copy and return it to you later during the week.

Activity 2	CONTENT AND COMPETENCIES TAUGHT PER LEARNING OUTCOME AND PER GRADE
ENGAGEMENT:	2. Identify and analyse content, context and competencies embedded in the LOs and ASs for Civil Technology. 2.1 Evidence of progression. 2.2 Re-arrange content if necessary to provide for progression.
TIME ALLOCATION:	1 hr
RESOURCES:	Worksheet and flip chart Subject Statement and Learning Programme Guide for Civil Technology.

INSTRUCTIONS:

- Use the worksheet below to complete the task.
- The content and competencies in one Assessment Standard is given in the example.
- Reproduce the table on a flip chart showing all the Assessment Standards for each of the Learning Outcomes.
- Identify and analyse the content, context and competencies imbedded in the Learning Outcomes and Assessment Standards of Civil Technology for Grades 10, 11 and 12.
- Participants work in pairs.
- Use the completed table and examine it for progression which is evident within the Learning Outcome and across the three grades? Provide examples of such progression. Write this down in your manual.
- Should any of the content be re-organised to display progression across the grades? Identify this content.
- Participants will report back as indicated by the facilitator.
- Allow each presenter approximately 5 minutes to give his/her presentation to the plenary.
- Facilitator allows comments/questions from the other groups.

LO 1: Technology, Society and the Environment	LO 2: Technological Process	LO 3: Knowledge and understanding (Theoretical)	LO 4: Application of knowledge (Practical work)
Identify the key words/noun in the AS that provides content for the lesson			
Identify the verb in the AS which will generate the evidence (competency)			
<u>Example:</u> AS: 1 Content: Environmental technology Competency: Gr. 10: Describe Gr. 11: Discuss & Evaluate Gr. 12: Predict	AS: Content: Competency: Gr. 10: Gr. 11: Gr. 12:	AS: Content: Competency: Gr. 10: Gr. 11: Gr. 12:	AS: Content: Competency: Gr. 10: Gr. 11: Gr. 12:

WRAP-UP

- How and why do we use the Assessment Standards in the design and delivery of a lesson? (Verb: evidence learner generates, Noun refers to the content of the lesson). Assessment Standards also refer to how much evidence and what level they have to be produced.

Activity 3	THE INTEGRATION OF LEARNING OUTCOMES AND ASSESSMENT STANDARDS WITHIN CIVIL TECHNOLOGY
ENGAGEMENT:	3.1 Demonstrate an understanding of the integration of LOs ASs within Civil Technology 3.2 Demonstrate an understanding of the integration of LOs ASs of Civil Technology with other subjects.
TIME ALLOCATION:	1hr 30min
RECOURSES:	NCS, LPG and worksheets, flip chart, Koki pens Power point presentation,
METHOD (S):	Presentation, working in pairs

INTRODUCTION (10 minutes)

- Facilitator introduces the activity
- Explain the concept of integration within a Learning Outcome and across Learning Outcomes.
- Explain the concept of the integration of Civil Technology with Technology subjects as well as other subjects.

EXAMPLE:

As an owner builder you are planning to build a small holiday house at a sea-side resort. Briefly describe how the following aspects would influence your design / planning:

Indigenous knowledge systems
 Environmental issues
 Material and their properties
 Cost
 Building regulations
 Site
 Availability of running water

INSTRUCTIONS:

- Participants work in pairs.
- Consider all the Assessment Standards and identify which Assessment Standards can be linked in developing an assessment task.
- Use Learning Outcome 2 as your organising Learning Outcome (context).
- Use a pen/pencil to draw lines to link the appropriate AS's.
- Use the flip chart and replicate the table given on the following page. Write under each Learning Outcome only the relevant Assessment Standard's code (number) and indicate the links using the Koki pen.
- During the report back indicate the possible links, and give an example of a possible assessment task you would set.
- In groups discuss how the Learning Outcomes and Assessment Standards can be integrated with Technology and other subjects. Give examples where integration is possible.

LO 1	LO 2	LO 3	LO 4
Technology, Society and the Environment	Technological Process	Knowledge and understanding (Theoretical)	Application of knowledge (Practical work)
11.1.1 discuss and evaluate the interrelationship between technology, society and the environment	11.2.1 identify, investigate, define, analyse problems in a given real life situation	11.3.1 describe the impact of the Occupational Health and Safety Act (OHS Act.) on personal safety	11.4.1 apply relevant safety measures in accordance with the OHS act
		11.3.2 discuss the use of materials in the built environment	11.4.2 identify, describe and apply the use of materials in the build environment
11.1.2 show consideration of human rights by discussing fair and equal employment opportunities	11.2.2 generate and/or design possible solutions for problems	11.3.3 explain the function, use and care of special tools and equipment	11.4.3 identify and use hand tools and power tools
		11.3.4 Graphics / communication show knowledge of advanced freehand sketching, instruments and basic CAD drawings	11.4.4 Graphics / communication make basic drawings using freehand sketching, instruments and CAD
11.1.3 describe, explain and respond to basic medical emergencies in context, taking cognisance of health issues such as HIV/AIDS	11.2.3 make/improve products according to the selected design	11.3.5 describe applicable terminology	11.4.5 apply and use the correct terminology in Civil Technology
		11.3.6 Applicable mechanics Demonstrate an understanding of the effects of forces and moments in structural engineering by applying design principles	11.4.6 Applicable mechanics perform simple experiments to show the effects of forces and moments on load-bearing structures
11.1.4 Compare how different cultures solve technological problems	11.2.4 evaluate the product against the initial design	11.3.7 Discuss the different manufacturing processes or construction methods	11.4.7 compare the different construction methods in a project
		11.3.8 analyse the maintenance of civil services	11.4.8 dismantle and assemble civil services
11.1.5 discuss the competencies required by entrepreneurs	11.2.5 present assignments by means of a variety of communication media	11.3.9 identify quantities of materials for a project	11.4.9 calculate quantities for a project
		11.3.10 compare the applicatin of materials used in joining applications	11.4.10 use various bonding materials and methods to join materials

WRAP-UP (30 minutes)

- 1 Suggest ways in which the Technology subjects can be integrated.
- 2 What is the significance of clustering the Learning Outcomes and Assessment Standards when planning for assessment?

Activity 4	WHAT MUST THE LEARNER KNOW, CAN DO AND VALUE AFTER EXPOSURE TO THE CONTENT IN THE LEARNING OUTCOMES
ENGAGEMENT:	Participants will study the LOs and unpack the SKVs that are imbedded in the Learning Outcomes (LO1 & LO3 or LO2 & LO4). Participants will write their answers on a flip chart for reporting back.
TIME ALLOCATION:	1hr 15min
RESOURCES:	Worksheet, Flip chart, Koki pens NCS and LPG for Civil Technology
BACKGROUND READING:	Subject Statement and Learning Programme Guide for Civil Technology.

INTRODUCTION (15 minutes)

- State the outcome for this activity, elaborating where necessary
- Contextualise – Make participants aware of the fact that in order to develop a Learning Program they should be well acquainted with the Learning Outcomes of Civil Technology

INSTRUCTIONS:

- Assign LOs to each group (LO1 & LO3 or LO2 & LO4)
- Ask groups to read the Assessment Standards and unpack the SKVs that may be imbedded in the Learning Outcome.
- Groups who are assigned Learning Outcome 1 & 3 are required to find the links to Assessment Standards of Learning Outcome 1
- Groups who are assigned Learning Outcome 4 & 2 are required to find the links to Assessment Standards of Learning Outcome 2
- Ask participants write their answers on a flip chart for reporting back.
- Nominate groups to report to plenary.

WRAP-UP (15 minutes)

- Highlight all the main content issues
- Use any further issues that arose during the engagement and consolidation process to inform what you highlight.

Assessment standard	Content (knowledge) Learning Outcome 3	Link to AS of Learning Outcome 1 (Values)
<i>(EXAMPLE)</i> 11.3.1 describe the impact of the Occupational Health and Safety Act (OHS Act.) on personal safety	the impact of the OHS Act on the use of tools and equipment	respond to basic medical emergencies in context, taking cognisance of health issues such as HIV/AIDS discussing of human rights issues
11.3.2	Use of materials in the built environment. (wood, plastic, metal, concrete, glass etc	
11.3.3	Hand & power tools and construction machinery	
11.3.4	Graphics / communication Free hand, instrument & CAD (Orthographic with sections and Isometric)	
11.3.5	Use of appropriate terminology: construction, material, forces, equipment, measuring, system, joining and graphics	
11.3.6	Stress and strain moments and force diagrams, centre of gravity	
11.3.7	concrete, plaster, mortar, brickwork and block work, formwork, waterproofing, excavations up to wall plate woodworking, steel, roof covering, finishing, cabinet making for a house	
11.3.8	the installation of water supply, sewage, storm water and electrical systems	
11.3.9	quantities of materials for a project such as the walls and finishing in a building	
11.3.10	Joining steel, metals, wood, plumbing, pipes	

Assessment standard	New content (Skills) Learning Outcome 4	Link to AS of Learning Outcome 2 (Skills)
11.4.1 (EXAMPLE) apply relevant safety measures in accordance with the OHS act	the application of safety (personal, hand tools, power tools, construction machinery and in the workplace)	make products according to the design and specify materials, tools and equipment, processes and sequence of manufacturing process
11.4.2	describe and apply the correct materials, for the Built Environment (wood, metal, concrete, plastic and glass and other materials)	
11.4.3	use and care of hand tools, power tools and construction machinery	
11.4.4	do freehand sketching, instrument drawings and basic CAD drawings (orthographic with sections, isometric)	
11.4.5	select and use the correct terminology for construction, material, forces, equipment, measuring, systems, joining and graphics	
11.4.6	calculate moments, stress and strain; determine the solutions, graphically for: force diagrams, centre of gravity(combined regular shapes)	
11.4.7	the application of concrete, plaster, mortar, brickwork and block work, formwork, waterproofing, excavations up to wall plate woodworking, steel, roof covering, finishing, cabinet making for a house	
11.4.8	the installation of water supply, sewage, storm water and electrical systems	
11.4.9	calculate the quantities of materials for a project such as the walls and finishing in a building	
11.4.10	application of joining methods in steel, metals, wood, plumbing and pipes	

IMPLICATIONS FOR TEACHING, LEARNING AND ASSESSMENT

What kind of teaching, learning and assessment approach is required to teach, learn and assess the content (i.e. skills, knowledge and values) indicated in Activity number 4?

What LTSM is required to teach the content imbedded in the Learning Outcomes to achieve the skills, knowledge and values indicated by the Assessment Standards?

Activity 5	IMPLICATIONS FOR TEACHING AND LEARNING
ENGAGEMENT:	Participants will demonstrate an understanding of the new approach to teaching and learning
TIME ALLOCATION:	2 hrs
RESOURCES:	Worksheet, Flip chart, Koki pens, Prestik NCS and LPG for Civil Technology
BACKGROUND READING:	Subject Statement and Learning Programme Guide for Civil Technology.

INSTRUCTIONS:

- Facilitator allocates two Assessment Standards per group to interact with this activity.
- The worksheet to be completed requires participants to suggest “**why**” and “**how**” the knowledge/skills will be taught with in the new approach to teaching and learning.
- Appoint a scribe to write the answers on a flip chart for reporting back.

	Grade 10	Grade 11	Grade 12
(EXAMPLE) What Content / Concepts	10.1 Safety	11.1 Safety	12.1 Safety
Why context	<ul style="list-style-type: none"> • To ensure personal safety in the work environment (classroom/work laboratories) to prevent incidents. (injury and loss of life) • It is ones human rights to work in a safe environment. The school must comply with the relevant safety regulations as stipulated in the OHS Act. • In the work place safety is a priority. • Create awareness of national building regulation to ensure a safe and secure structure. Use as reference the SANS code of practice for building construction. 		
How	<ul style="list-style-type: none"> • Relate safety to all aspects of the content with specific reference to working with material, equipment and machinery etc. • Actively apply the safety measures where applicable. • Safety not to be taught in isolation but in the context of a practical situation. 		
What Content / Concepts	10.2 Material used in the Built Environment properties	11.2 Material used in the Built Environment ▪ uses	12.2 Material used in the Built Environment ▪ sustainability
Why context			
How			

What Content / Concepts	10.3 Equipment	11.3 Equipment	12.3 Equipment
	Use and care of: <ul style="list-style-type: none"> ▪ hand tools ▪ power tools ▪ machinery 		Use and care of: <ul style="list-style-type: none"> ▪ hand tools ▪ power tools ▪ specialized tools ▪ machinery
Why context			
How			
What Content / Concepts	10.4 Graphics/ communication	11.4 Graphics/ communication	12.4 Graphics/ communication
Why context			
How			

What Content / Concepts	10.5 Terminology	11.5 Terminology	12.5 Terminology
	<ul style="list-style-type: none"> ▪ Select and use the correct terminology for construction, material, forces, equipment, measuring, systems, joining and graphics. 		
Why context			
How			
What Content / Concepts	10.6 Applied mechanics	11.6 Applied mechanics	12.6 Applied mechanics
Why context			
How			

What Content / Concepts	10.7 Construction	11.7 Construction	12.7 Construction
	<ul style="list-style-type: none"> ▪ Concrete / Plaster / Mortar ▪ Brickwork and Block work ▪ Waterproofing ▪ Formwork ▪ Excavations ▪ Woodworking ▪ Steel ▪ Roof covering ▪ Finishing ▪ Cabinet making ▪ Technical advances 		
Why context			
How			
What Content / Concepts	10.8 Civil services	11.8 Civil services	12.8 Civil services
	<ul style="list-style-type: none"> ▪ Water Supply ▪ Sewage ▪ Storm water ▪ Electrical systems 		<ul style="list-style-type: none"> ▪ Water Supply ▪ Sewage ▪ Electrical systems
Why context			
How			

What Content / Concepts	10.9 Quantities Use basic mathematical formulae and SI units to calculate quantities of materials for a small project.	11.9 Quantities Use basic mathematical formulae and SI units to calculate quantities of materials for a small project/structure.	12.9 Quantities Extract quantities and do a cost analysis for a small project.
Why context			
How			
What Content / Concepts	10.10 Joining	11.10 Joining	12.10 Joining
	<ul style="list-style-type: none"> ▪ Brick ▪ Steel/metals ▪ Wood ▪ Plumbing/pipes 		
Why context			
How			

PRESENTATION	LTSM REQUIRED TO TEACH CIVIL TECHNOLOGY
ENGAGEMENT:	Discussion in plenary.
TIME ALLOCATION:	30 minutes
RESOURCES:	Guidelines for selecting LTSM, Power Point presentation
BACKGROUND READING:	None

INSTRUCTION:

Refer to the Teacher Resource Manual for the criteria for selecting learner, teacher support material (LTSM).

Activity 6	IMPLICATIONS FOR ASSESSMENT
ENGAGEMENT:	Participants will demonstrate an understanding of the new approach to assessment in Civil Technology.
TIME ALLOCATION:	2 hrs
RESOURCES:	Worksheet, Flip chart, Koki pens, Prestik NCS and LPG for Civil Technology
BACKGROUND READING:	Subject Statement, Learning Programme Guide and Assessment Guideline document for Civil Technology

INTRODUCTION: (3 minutes)

- Facilitator asks participants to design a single story dwelling. (No further information should be given.)

ENGAGEMENT (17 minutes)

- Participants must design a single story dwelling. This activity must be done individually.
- Allow participants 10 minutes to complete the drawing and 7 minutes to assess their work.
- Participants will assess their task themselves.
- Facilitator reads out the marking/assessment criteria to participants to mark their own drawing.
- Participants allocate marks according to the set criteria.

WRAP UP

(10 minutes)

- Facilitator asks participants for scores from those willing to provide them.
- Facilitator asks participants how they feel about being assessed without the assessment criteria given in advance.
- Facilitator emphasises the importance of planning and designing assessment according to principles.
- In Outcomes-Based Assessment there are some definite principles that we as educators need to adhere to when designing assessment activities, whether it is for formative or summative purposes. We will now look at those principles.

PRESENTATION	PRINCIPLES OF ASSESSMENT
ENGAGEMENT:	Participants will demonstrate an understanding of the new approach to assessment in Civil Technology.
TIME ALLOCATION:	2 hrs
RESOURCES:	Data projector, laptop computer
BACKGROUND READING:	Subject Statement, Learning Programme Guide and Assessment Guideline document for Civil Technology

CHECKLIST TO BE USED WHEN PLANNING FOR ASSESSMENT

NO	ASPECT TO BE CONSIDERED	YES	NO	COMMENT
1	Is the purpose of assessment clear?			
2	Are the criteria to be used to assess performance indicated?			
3	Does the activity allow the learners to engage with the learning outcome(s)?			
4	Does the activity provide for different levels of learner performance?			
5	What methods of assessment are used?			
6	Are the methods used appropriate?			
7	Are the learners involved in the assessment?			
8	Are the results to be recorded?			
9	Is the tool for assessing learners' performance designed effectively?			
10	Is it clear how the result is to be used?			
11	Have all the assessment principles been addressed?			

Activity 7	DESIGNING CIVIL TECHNOLOGY QUESTIONS
ENGAGEMENT:	Re-design the given NATED 550 question to suit the requirements of Civil Technology.
TIME ALLOCATION:	4 hrs
RESOURCES:	Question, flipchart, folio paper, Koki pen
METHOD(S):	Presentation, working in groups

INTRODUCTION: (5 minutes)

- Participants are reminded of the way the memo is set for a NATED 550 question and that in some cases teachers will not consider alternative correct responses to a question.
- Facilitator asks participants to read the question and list all the LOs and ASs that may have the potential to transform the question into an Outcomes Based Assessment (OBA) one.
- Re-design the question keeping in mind the LOs and ASs you have identified.

WRAP UP (10 minutes)

- Facilitator asks a representative from one group to report their findings.
- Facilitator invites members of the house to comment or add more information.
- Facilitator emphasises the importance of planning and designing questions according to principles of OBA.

QUESTIONS FOR ANALYSIS

EXAMPLE

You are a carpenter who is responsible for the erection of a house's roof.

Explain step by step how you would plan and construct a Howe truss to span 5 metres. Use the following as guidelines:

- 1.6.1 Make a freehand sketch to help you plan this task.
- 1.6.2 Material and dimensions
- 1.6.3 Due to the fact that there is no electricity on site, you have to use hand tools only.
- 1.6.4 Fixing of the different parts
- 1.6.5 Preservation

What LOs and ASs can I use to re-design the question so that it complies with an OBA type question? Use this table to list your LO and AS.

LEARNING OUTCOMES	ASSESSMENT STANDARDS
1	1, 2 & 3
2	1, 2, 3, 4 & 5
3	1, 2, 5, 6, 7 & 9

TRANSFORMED NATED 550 QUESTION INTO CIVIL TECHNOLOGY TYPE QUESTION

A double-story house is being build amongst single story dwellings in a most picturesque and wilderness areas of the province. As the Carpenter on the building site you are requested to design the roof trusses to a span of 7 metres and a pitch of 30 degrees.

Answer the following questions based on this scenario.

- 1.1 Design by means of a single line drawing three possible types of roof trusses. (3)
- 1.2 Choose one, which is most suited for the house, and motivate your choice. (2)
- 1.3 Add the necessary dimensions to your sketch and list the material to be used. (4)
- 1.4 Due to the fact that that you will be working on site, you will have to use portable electrical tools.
Make a list of the portable electrical and hand tools you will require to make the roof trusses. (4)
- 2.1 Discuss the different manufacturing processes in making the truss you selected. (4)
- 2.2 Do a calculation to determine how much material is needed for one truss. (4)
- 2.3 How would the timber be treated to prevent attacks from termites and beetles. (1)
- 2.4 List five safety regulations that must be adhered to while completing this task on site. (5)
- 2.5 Briefly describe what impact the double-story house would have on the neighbours and surroundings. (8)

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INSTRUCTION

Use the above example as a guide to re-design the following NATED 550 questions into an Outcomes Based Assessment question.

This is a group activity.

Appoint a scribe and a reporter.

- Participants must read the question provided.
- Use the flip chart to complete the activity.
- Participants will now rephrase the question in OBA format.
- Participants will then complete the table and indicate how the different LOs and ASs are integrated.

Facilitator will allocate 2 questions per table.

Use the table below to determine what LOs and ASs have the potential to transform the NATED 550 question into a Civil Technology one.

One person from each group will be asked to report back.

LEARNING OUTCOMES	ASSESSMENT STANDARDS

NATED 550 QUESTIONS

Question 1

A building contractor is going to build a double storey house. The house is 14m long x 10m wide. He needs a scaffold to do that job. The ground on which the scaffold is going to be erected is soft and sandy. You are requested to design a scaffold for the building contractor taking into account the nature of the ground. The scaffold must address the following:-

- Safety of human kind (2)
- Solution to the building contractor's problem (2)
- The type of materials that it will be made of. (5)
- Quantities of materials required to make the scaffold (5)
- The cost of making the scaffold. (4)

Question 2

A single flight of stairs has seven steps. The staircase starts on a concrete floor and ends with a landing 800mm long and 100mm thick supported by a 230mm thick brick wall. The rise of each step is 150mm and the tread is 250mm. The waist is 100mm thick. Draw to a scale of 1:10 the vertical cross section through the formwork necessary to support the concrete. In your drawing show all methods of propping and supporting the formwork. (30)

Question 3

Make a neat sketch of the vertical cross section of a septic tank. In your sketch show the following:-

- Concrete floor 250mm thick
- External walls 220mm thick
- Partition wall 110mm thick
- Inlet and outlet pipes with 80mm diameter
- Cover concrete 75mm thick
- steel cover 900mm long x 60mm wide x 20mm thick
- Adjacent ground

Write the title immediately below the drawing or diagram. (12)

Question 4

Make a labelled sketch of a solar collector with its own storage tank interconnected to a horizontal pressure-type geyser. (15)

Activity 8	COGNITIVE SKILLS WITH SPECIFIC REFERENCE TO CIVIL TECHNOLOGY
ENGAGEMENT:	Explain and illustrate how the LOs and ASs facilitate cognitive and conceptual development within and across grades
TIME ALLOCATION:	45 minutes
RESOURCES:	Worksheet
METHOD(S):	Presentation, working in pairs

INTRODUCTION (10 minutes)

- At the end of this activity you will be able to understand and identify the levels of Bloom's taxonomy by examining the assessment standards.
- Cognitive strategies are procedures used for discovering knowledge. Benjamin Bloom and his associates developed a classification of learning outcomes which is still useful for both research and teaching. Bloom's taxonomy pertains to the cognitive objectives of instruction and divides them into several types. These range from goals referring to relatively concrete intellectual skills to ones referring to very abstract thought.

Bloom classifies learning into the following categories:

1. **Knowledge** – the ability, on request, to remember, recall, or recognise facts or ideas.
2. **Comprehension** – the ability to use knowledge that is remembered more or less as it is originally presented and intended to be used.
3. **Application** – the ability to use general ideas or principles in particular situations.
4. **Analysis** – the ability to separate the elements of an idea or passage and to examine each one individually.
5. **Synthesis** – the ability to combine elements into greater structures or wholes.
6. **Evaluation** – the ability to judge how well ideas and materials satisfy certain criteria.

ENGAGEMENT

(25 minutes)

INSTRUCTIONS:

- Participants organise themselves into pairs.
- In the table below, column A contains a list of assessment standards across all grades.
- Participants must identify which level of Bloom’s Taxonomy appears to be addressed by the following extracts from the assessment standards (see teacher resource manual).
- Use the **verb** in the assessment standard to guide you.

	Grade	Assessment Standard (Verbs)	Level on Bloom’s Taxonomy
A	10, 11 & 12 Technological Process	Identify, investigate, define, analyse problems in a given real life situation	Knowledge Analysis Comprehension Analysis
B		Design possible solutions for problems	
C		Make/improve products according to the selected design	
D		Evaluate the product against the initial design	
E		Present assignments by means of a variety of communication media	
F	10	Describe the properties of materials	
G	11	Discuss the use of materials	
H	12	Evaluate the sustainability of materials	
I	10	Describe the function of a tool	
J	11	Explain the function of a tool	
K	12	Use and maintain specialized tools	
L	10	Show knowledge of freehand sketching	}
	11	Show knowledge of instrument drawing	
	12	Show knowledge of CAD drawing	

M	10	Demonstrate an understanding of applicable terminology	
N	11	Describe applicable terminology	
O	12	Apply terminology in proper context	
P	10	Distinguish between different types of forces	
Q	11	Perform experiments to show the effects of forces	}
	12	Perform experiments to determine stress and strain	
R	10	Explain civil services	
S	11	Analyse the maintenance of civil services	
T	12	Identify the most suitable processes in designing civil services	
U	10	Calculate quantities of materials	
V	10	Explain the uses of different joining methods	
W	11	Compare the application of joining materials	
X	12	Evaluate and compare the application of joining materials	

WRAP UP (10 minutes)

- In developing activities and assessment tasks educators need to be aware of the different teaching strategies as well as the learning styles and cognitive skills of the learners in their class groups.
- Teachers must be aware of terminology, which could tend to confuse learners.

PRESENTATION	PERFORMANCE ASSESSMENT TASK
ENGAGEMENT:	Participants will understand the nature of the Performance Assessment Task
TIME ALLOCATION:	50 min
RESOURCES:	Subject Assessment Guideline document
BACKGROUND READING:	Subject Statement, Learning Programme Guide and Assessment Guideline document for Civil Technology

Activity 9	PERFORMANCE ASSESSMENT TASK (Continue)
ENGAGEMENT:	Critique and develop Performance Assessment Tasks as well as assessment rubrics.
TIME ALLOCATION:	3 hrs
RESOURCES:	Subject Assessment Guideline document
BACKGROUND READING:	Subject Statement, Learning Programme Guide and Assessment Guideline document for Civil Technology

INSTRUCTIONS:

- Participants will examine and critique the Practical Assessment Task along with the example of assessment tools found in the Subject Assessment Guidelines.
- Do the task and its related activities address the Assessment Standards of Learning Outcome 2?
- Make suggestions for improvements on the Performance Assessment Task.
- In your groups develop a Performance Assessment Task suitable for Grade 11.
- Write your task on the folio paper provided so that copies could be made for each participant.
- Duplicate the task on the flip chart for feedback purposes.

PRESENTATION	CONCLUSION / WRAP-UP
ENGAGEMENT:	Discussion
TIME ALLOCATION:	10 min
RESOURCES:	Subject Assessment Guideline document
BACKGROUND READING:	Subject Statement, Learning Programme Guide and Assessment Guideline document for Civil Technology

CONTENT:

- Pull all the issues together as discussed in various Learning Outcome and Assessment Standard discussions
- PowerPoint presentation – highlight the subject content and approach

SESSION 3
Annual assessment plan (5 hours)

ACTIVITY 1: Introduction to assessment in the NCS (¼ hour)

FORM OF ACTIVITY: Presentation and discussion

RESOURCES: PowerPoint Presentation, Laptop, Data Projector, and National Protocol on Assessment

CONTENT:

- Approach to assessment: Criteria-driven
- Recording process: Record one global mark / code per task and refer to the Subject Assessment Guidelines for guidance on how to arrive at the final mark for the subject
- Reporting process: 7 codes and percentages
- Portfolios: Teacher and learner

ACTIVITY 2: Programme of Assessment for Grades 10 and 11

FORM OF ACTIVITY: Presentation and discussion

RESOURCES: PowerPoint Presentation, Laptop, Data Projector, and Subject Assessment Guidelines

CONTENT:

- Programme of Assessment for Grades 10 and 11 (Section 2 of the Subject Assessment Guidelines): Number of tasks
- Nature of tasks: Forms of assessment suitable to the subject (Section 3 of the Subject Assessment Guidelines) and suitable tools
- Practical Assessment Task (PAT) – if applicable to the subject
- Weighting of tasks for the formal Programme of Assessment and mark allocation

ACTIVITY 3: Development of a Grade 11 annual assessment plan

FORM OF ACTIVITY: Presentation, interactive and discussion

RESOURCES: PowerPoint Presentation, Laptop, Data Projector, and Subject Assessment Guidelines

CONTENT:

- Programme of Assessment for Grade 11: Tasks, topics, tools and dates

INSTRUCTIONS:

- Engage participants in the compilation of a Grade 11 annual assessment plan in which they indicate:
 - Seven tasks: 2 Tests, 2 exams, 2 other tasks and PAT
 - Topics for each task
 - Assessment tools for each task
 - Date and duration of each task
- Ask participants to revisit the Grade 11 Work Schedule (Session 3: Activity 3) and to align the annual assessment plan for Grade 11 with the assessment tasks listed in the Work Schedule

**SESSION 4 –
Planning for teaching subjects in the NCS (8 hours)**

ACTIVITY 1: Introduction to the planning cycle (½ hour)

FORM OF ACTIVITY: Presentation and discussion

RESOURCES: PowerPoint Presentation, Laptop, and Data Projector

CONTENT:

- Three stages of planning
- Purpose, role-players and duration per stage
- Issues to consider when developing a Learning Programme
- Brief overview of the key activities and development process per stage

ACTIVITY 2: Introduction to the Grade 11 Work Schedule (1 hour)

FORM OF ACTIVITY: Presentation and discussion

RESOURCES: OHP of Grade 11 Work Schedule, OHP Projector, OHP Pens, OHP Sheets, Subject Assessment Guidelines, Learning Programme Guidelines, and Subject Statement

CONTENT:

- Elements of design
- Process of design
- Integration: What, how and why?
- Sequencing: What, how and why?
- Pacing: What, how and why?
- Suggested assessment tasks: What and why? – will return to this in Session 4
- LTSM: What and why?

ACTIVITY 3: Critique the Grade 11 Work Schedule (4½ hours)

FORM OF ACTIVITY: Interactive, report back and discussion

RESOURCES: Grade 11 Work Schedule, Subject Statement, Learning Programme Guidelines, and Subject Assessment Guidelines

CONTENT: Grade 11 Work Schedule

INSTRUCTIONS:

- Participants study the example of the Grade 11 Work Schedule provided and critique it:
- Does the Work Schedule cover all the Assessment Standards (i.e. content)?
- Integration: Are the Assessment Standards appropriately linked?
- Are the Assessment Standards covered in sufficient detail and depth?
- Pacing: Is the time allocation across the 40 weeks appropriate?

- Sequencing: Is the content presented in the correct order?
- Are relevant LTSM listed? If not, list the LTSM required.
- How can the Work Schedule be improved?

ACTIVITY 4: Report back (1 hour)

FORM OF ACTIVITY: Report back and discussion

RESOURCES: Subject Statement, Learning Programme Guidelines

CONTENT: Improved Grade 11 Work Schedule

INSTRUCTIONS:

- Allow different groups to present their improved version of the exemplar Work Schedule for Grade 11
- Engage participants in a discussion after each presentation

ACTIVITY 5: Development of the first Lesson Plan for Grade 11 (1 hour)

FORM OF ACTIVITY: Presentation, interactive, report back and discussion

RESOURCES: PowerPoint Presentation, Laptop, Data Projector, Subject Statement, and Learning Programme Guidelines

CONTENT:

- Grade 11 Lesson Plan
- Elements of design
- Process of design

INTRODUCTION:

- Lesson Plan: What it is and its duration
- Pointers on deciding on the number of Lesson Plans to be written
- Elements and design of a Lesson Plan
- Teaching method: What and why
- Assessment strategy: Who, when, how and form of assessment
- Expanded opportunities: Inclusive approach to accommodate all learners

INSTRUCTIONS:

- Provide an overview of the elements and the design process of a Lesson Plan
- Engage participants in the development of the first Lesson Plan that will be presented for the first 2-5 weeks of the school year according to the Grade 11 Work Schedule critiqued in Activity 3
- Allow one group to present and then discuss their presentation

WORKSHEET 1

**SESSION 3 – ACTIVITY 5
FIRST GRADE 11 LESSON PLAN**

SUBJECT: CIVIL TECHNOLOGY LESSON PLAN: 1 DURATION: 12 hours	GRADE: 11 NO. OF ACTIVITIES: WEEK / DATE: Weeks 1-6
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CONTEXT:

LINK WITH PREVIOUS LESSON: CIVIL TECHNOLOGY	LINK WITH NEXT LESSON:
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CORE CONTENT (KSVs):
Replace!

	ACTIVITY 1	ACTIVITY 2	ACTIVITY 3	Etc.
LOs & ASs: LO1.1 LO3.1 LO4.4				
CORE CONTENT:				
DETAIL OF ACTIVITY:				
TEACHING METHOD:				
ASSESSMENT STRATEGY:				
EXPANDED OPPORTUNITIES:				
RESOURCES:				
TEACHER REFLECTION:				

WORKSHEET 2

**SESSION 4 - ACTIVITY 3
ANNUAL ASSESSMENT PLAN FOR GRADE 11**

SUBJECT: CIVIL TECHNOLOGY

GRADE: 11

YEAR: 2007

TERM 1	TERM 2	TERM 3	TERM 4
TASK 1	TASK 3	TASK 5	TASK 7
LO(s) and Topic: Form: Date: Duration: Tool:	LO(s) and Topic: Form: Date: Duration: Tool:	LO(s) and Topic: Form: Date: Duration: Tool:	LO(s) and Topic: Form: Date: Duration: Tool:
TASK 2	TASK 4		
LO(s) and Topic: Form: Date: Duration: Tool:	LO(s) and Topic: Form: Date: Duration: Tool:		
TASK 6: Practical Assessment Task			
LO(s) and Topic: Date: Duration: Tool(s):			

