Assessment Guide
Primary Agriculture

Physical quantities & geometrical relationships in 2 and 3 dimensional space

Assessor: .................................................................
Workplace / Company: ................................................
Commodity: ................................. Date: ......................

The availability of this product is due to the financial support of the National
Department of Agriculture and the AgriSETA.
Before we start...

This assessment guide contains all necessary activities and instructions that will enable the assessor and learner to gather evidence of the learner’s competence as required by the unit standard. This guide was designed to be used by a trained and accredited assessor whom is registered to assess this specific unit standard as per the requirements of the AgriSETA ETQA.

Prior to the delivery of the program the facilitator and assessor must familiarise themselves with content of this guide, as well as the content of the relevant Learner Workbook.

The assessor, facilitator and learner must plan the assessment process together, in order to offer the learner the maximum support, and the opportunity to reflect competence.

The policies and procedures that are required during the application of this assessment are available on the website of the AgriSETA and should be strictly adhered to. The assessor must familiarise him/herself with this document before proceeding.

This guide provides step-by-step instructions for the assessment process of:

| Title: | Measure, estimate & calculate physical quantities & explore, critique & prove geometrical relationships in 2 and 3 dimensional space in the life and workplace of adult with increasing responsibilities |
| US No: | 12417 | NQF Level: 4 | Credits: 4 |

This unit standard is one of the building blocks in the qualification listed below. Please mark the qualification you are currently assessing, because that will be determined by the context of application:

<table>
<thead>
<tr>
<th>Title:</th>
<th>ID Number</th>
<th>NQF Level</th>
<th>Credits</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Certificate in Animal Production</td>
<td>48979</td>
<td>4</td>
<td>120</td>
<td>☐</td>
</tr>
<tr>
<td>National Certificate in Plant Production</td>
<td>49009</td>
<td>4</td>
<td>120</td>
<td>☐</td>
</tr>
</tbody>
</table>

Please mark the learning program you are enrolled in:

<table>
<thead>
<tr>
<th>Are you enrolled in a:</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learnership?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Skills Program?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Short Course?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Note to Assessor:
If you are assessing this module as part of a full qualification or learnership, please ensure that you have familiarized yourself with the content of the qualification.
A swimming pool is 7m long, 5m wide, 1m deep at the shallow end, and 3m deep at the deep end. The floor slopes evenly. What is the inside surface of the swimming pool and what is the volume (in m³)?

**Model Answer(s):**

**Drawing of pool**

Volume = area of base x height

\[
\text{Volume} = \frac{1}{2} (1m+3m) \times 7m \times 5m = 70m^2
\]

**Net diagram**

Surface 2 is not included in the surface area calculation as a swimming pool does not have a "lid".

The grey line in surface 1 allows calculation of length of surface 5 (by Pythagoras).

\[
\text{Hypotenuse}^2 = 7^2 + 2^2 \\
\text{Hypotenuse} = 7,28m
\]

Total surface area = \(2\times\text{Area 1} + \text{area 3} + \text{area 4} + \text{area 5}\)

\[
= [2 \times \frac{1}{2} (1+3)\times 7] + [1\times 5] + [3\times 5] + [5\times 7,28] \\
= 28 + 5 + 15 + 36,4 \ m^2 \\
= 84,4 \ m^2
\]
Calculate the volume of a cylinder with a radius of 3 metre and a depth of 5 metre. What is the surface area of the wall of the cylinder?

**Model Answer(s):**

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Surface area of wall of cylinder = area 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Diagram" /></td>
<td>= area of rectangle</td>
</tr>
<tr>
<td></td>
<td>We need to calculate the length of the top and bottom of the rectangle. This is the same as the circumference of the circle.</td>
</tr>
<tr>
<td></td>
<td>Circumference = 2πr = 2 x π x 3 x 3m = 18,8m</td>
</tr>
<tr>
<td></td>
<td>Area = length x breadth</td>
</tr>
<tr>
<td></td>
<td>= 18,8m x 5m = 94m²</td>
</tr>
</tbody>
</table>
A farmer decided to build a dam on this farm. He wanted to have a cylindrical shaped dam. The diameter of the dam was to be 20m and the depth was to be 4m. How many litres of water will the dam hold when it is full?

Model Answer(s):

Diagram

Volume = area of base x height
= area of circle x height
= \( \pi \times 10m \times 10m \times 4m \)
= 1256,6m³
Measure, estimate & calculate physical quantities & explore, critique & prove geometrical relationships in 2 and 3 dimensional space in the life and workplace of adult with increasing responsibilities.

Primary Agriculture  NQF Level 4  Unit Standard No: 12417

4

Instructions to learner:
Individual assignment


Your city council has decided to build a cone shaped reservoir. The plan that was given to the building contractor indicated that the top diameter of the reservoir must be 50m. The depth of the reservoir is indicated at 30m. What volume of water can be stored in the reservoir? What is the surface area of the wall of the cone?

Model Answer(s):

The radius is 25m
The volume of a cone is one third of the volume of a cylinder.
Volume = (Area of Circle x height)/3
= (π x r² x height)/3
= (π x 25m x 25m x 30m) /3
= 19634,95m³

The side of the cone is calculated by Pythagoras.
S² = 25² + 30² = 625 + 900 = 1525
S = 39,05m
The area of the side is ¾ of a circle.
Area = ¾ x π x r²
= ¾ x π x 39,05m x 39,05m
= 3593,2m²

My Notes ...

...
1. A ladder rests against a wall 24m high. The foot of the ladder is 7m from the foot of the wall. Calculate the length of the ladder.

Model Answer(s):

\[ x^2 = 24^2 + 7^2 = 576 + 49 = 625 \]
\[ x = 25m \]

2. In the triangle below

Model Answer(s):

a) name the hypotenuse
b) name the side opposite \( \theta \)
c) name the side adjacent to \( \theta \)
d) \( \sin \theta = c/a \)
e) \( \cos \theta = b/a \)
f) \( \tan \theta = c/b \)

3. Morgan is standing 5 metres away from the base of a tree. The angle between his feet and the top of the tree is 55°. How tall is the tree?

Model Answer(s):

\[ \tan 53^\circ = h/5 \]
\[ 5\tan 53^\circ = h \]
\[ h = 6.63m \]
4. It is 11:00 on a sunny day. You are standing next to a block of flats.

![Diagram of a block of flats and a shaded area with an angle of 30° and a distance of 30 m]

a. Calculate the height of the block of flats (y) based on the information in the diagram.

b. Calculate the hypotenuse of the shaded area by using Pythagoras’ theorem.

**Model Answer(s):**

a. \[
\sin 30^\circ = \frac{y}{30m} \\
y = 30 \times \sin 30^\circ = 15m
\]

b. \[
\ell^2 = 15^2 + 30^2 = 225 + 900 = 1125 \\
c = 33.54m
\]
Model Answer(s):
1. How many bedrooms does this house have?
2. How many doors does the owner bedroom have?
3. How many bathrooms are there and where are they situated?
   First one between bedroom 3 and kitchen, second one en suite to owner bedroom
4. What does each bathroom contain?
   Basin, toilet, bath/shower
5. How many windows does the kitchen have?
6. What is included in bedroom 2?
   Built-in wardrobe
7. What is the room next to Bedroom 2?
   Entrance hall
8. What is the floors space area of the living room?
   Area = 22.92 m²
9. What interesting feature does this house have that we do not always find in a South African house?
   Basement, double basin in en suite bathroom
Study the map of the centre of Johannesburg on the next page and answer the questions below:

1. What is the distance from the corner of Pretoria & Claim St. to the T-junction of Bree & End St.?

2. What are the names of the street that surround the Ellis Park Rugby Stadium?

3. What establishment is on the corner of Twist & Wolmarans St?

Model Answer(s):

Answers as per map.
Instructions to learner:
Individual assignment

1. The map of Africa indicates a scale of 1: 40,000,000. What does that mean?
2. Name the neighbouring countries to Zambia.
3. What are the names of the two oceans that surround Africa?
4. What is the former name of Namibia?
5. What is the capital of Nigeria?
Model Answer(s):
1. The map of Africa indicates a scale of 1: 40,000,000. What does that mean?
   1cm on the map represents 40 000 000 cm or 400km in real life
2. Name the neighbouring countries to Zambia.
   e.g. Angola, Botswana, Zimbabwe, Congo, Malawi
3. What are the names of the two oceans that surround Africa?
   Atlantic and Indian
4. What is the former name of Namibia?
   South West Africa
5. What is the capital of Nigeria?
   Lagos

My Notes ...
1. What is the Universal Time Constant?
2. What does GMT stand for?
3. How many hours is South Africa ahead of GMT?
4. How many degrees make up one hour time difference?
5. What is the time difference between South Africa and Perth, Australia?
6. What is the International Date Line?
Model Answer(s):

1. What is the Universal Time Constant?
   Degrees of longitude that all other time zones are measured against.

2. What does GMT stand for?
   Greenwich Mean Time

3. How many hours is South Africa ahead of GMT?
   3

4. How many degrees make up one hour time difference?
   10

5. What is the time difference between South Africa and Perth, Australia?
   They are 6 hours ahead

6. What is the International Date Line?
   Line along which date is set, i.e. if you cross the line at midnight, you lose or gain 24 hours.
Instructions to learner:
Individual assignment

a. (5,2)
b. (-4,-3)
c. (-2,4)
d. (1,-4)

Model Answer(s):

My Notes ...
Summative Test and Attitude & Attribute Evaluation

Before the knowledge test is undertaken, the learner must be reminded of what is expected from him / her in terms of summative and reflexive competence. Read and explain to the learner, the Preparation for Your Final Assessment section in the learner workbook. Learners and assessor should sign off this section to acknowledge that this step was completed.

Please set up a knowledge test from the questions given as a guideline to learners and supply each learner with a test sheet.

Supply each report with the following heading:

<table>
<thead>
<tr>
<th>Unit Standard:</th>
<th>12417</th>
<th>NQF Level:</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner Name:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You are required to draw up the plan for a house with six equal sides. In other words, the outline of the house must be a hexagon. A hexagon is shown below. Your plan must fit onto an A4 page.

Your plan must include the following:

a. A scale (e.g. 5cm represents 1m)

b. At least 2 bedrooms

c. A kitchen

d. A passage
e. A lounge/dining room
f. At least one bathroom
g. The lengths of all walls must be indicated on the diagram

Additional task:

a. Calculate the surface area of a room of your choice.

b. All plans and calculations must be attached to the pages in this work book.

c. Please attach your plan to this page.

d. Show all calculations on this page.

### Model Answer(s):

Marking rubric for research assignment

<table>
<thead>
<tr>
<th>Category</th>
<th>mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neatness of diagram</td>
<td>mark</td>
</tr>
<tr>
<td>Very neat</td>
<td>2</td>
</tr>
<tr>
<td>Neat</td>
<td>1</td>
</tr>
<tr>
<td>Messy</td>
<td>0</td>
</tr>
<tr>
<td>Plan contains the correct number of rooms</td>
<td>mark</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Rooms are labelled</td>
<td>mark</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Scale indicated</td>
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<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Scale correct</td>
<td>mark</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Lengths of walls entered on diagram</td>
<td>mark</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Provision was made for doors</td>
<td>mark</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>The plan makes sense (e.g. dining room next to kitchen, bathrooms accessible from living areas, there is a front door etc)</td>
<td>mark</td>
</tr>
<tr>
<td>Excellent</td>
<td>2</td>
</tr>
<tr>
<td>Adequate</td>
<td>1</td>
</tr>
<tr>
<td>Poor design</td>
<td>0</td>
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</table>

**Total for plan: 10**

Calculation of surface area of one room:

(5)

**Total for assignment:**

(15)
**Assessment Feedback Form**

<table>
<thead>
<tr>
<th>Comments / Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback to learner on assessment and / or overall recommendations and action plan for competence:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feedback from learner to assessor:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Assessment Judgement</th>
<th>Actions to follow:</th>
</tr>
</thead>
<tbody>
<tr>
<td>You have been found:</td>
<td></td>
</tr>
<tr>
<td>☐ Competent</td>
<td>☐ Assessor report to ETQA</td>
</tr>
<tr>
<td>☐ Not yet competent in this unit standard</td>
<td>☐ Learner results and attendance certification issued</td>
</tr>
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<table>
<thead>
<tr>
<th>Learner’s Signature:</th>
<th>Date:</th>
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<table>
<thead>
<tr>
<th>Assessor’s Signature:</th>
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<table>
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<th>Moderator’s Signature:</th>
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