# APPLY ENGINEERING SCIENCE PRINCIPLES

**UNIT CODE: ENG/OS/AME/CC/03/4/A**

**UNIT DESCRIPTION**

This unit describes the competencies required by individuals in order to apply a wide range of engineering science principles in their work. It includes carrying out measurements, determining force, work, energy and power. It also involves solving simple problems on friction and identification of characteristics of light and sound. It also involves applying of general chemistry in experiments

**ELEMENTS AND PERFORMANCE CRITERIA**

| **Element**<br>These describe the **key outcomes** which make up workplace function (to be stated in active voice). | **Performance criteria**<br>These are **assessable statements** which specify the required level of performance for each of the elements (to be stated in passive voice).<br>**Note: *bold and italicized terms are elaborated in the range*** |
|---|---|
| 1. Carry out measurements | 1.1 Select appropriate ***units of measurements***<br>1.2 Convert units from one form to another<br>1.3 Carry out simple measurements |
| 2. Determine force, work, energy and power | 2.1 Define force, work, energy and power<br>2.2 Describe ***forms of energy***<br>2.3 Convert energy from one form to another<br>2.4 Solve simple calculations on force, work, energy and power |
| 3. Solve simple problems on friction | 3.1 State meaning of friction<br>3.2 Identify the advantages and disadvantages of friction<br>3.3 Solve simple problems on friction |
| 4. Identify characteristics of light and sound | 4.1 Identify sources of light and sound<br>4.2 State the laws of reflection and refraction<br>4.3 Determine the characteristics of images formed by mirrors<br>4.4 Solve simple problems involving location of images<br>4.5 Describe propagation of sound in a given medium<br>4.6 State the properties of sound |

| | |
|---|---|
| 5. Apply general chemistry in experiments | 5.1 State the classification of matter<br>5.2 Describe the strength of chemical bonds<br>5.3 State the properties of elements and compounds<br>5.4 State the properties of acids and bases<br>5.6 Prepare salts from acids and bases |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

| Variable | Range |
|---|---|
| 1. Units of measurements include but not limited to: | • Kilograms<br>• Metres |
| 2. Forms of energy include but not limited to: | • Kinetic energy<br>• Potential energy |



**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate ability related to:

- Communication
- Team work
- Problem solving
- Planning and organizing
- Self-management
- Measurement
- Use of chemicals in laboratory

**Required Knowledge**

The individual needs to demonstrate knowledge of:

1. Types of chemicals and equipment used in a science laboratory
2. National legislation and regulations
3. Safe working practices and procedures to be followed when in a science laboratory
4. Safety and environmental hazards associated with practicals in a science laboratory

5. Basic maintenance and servicing of science laboratory equipment

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

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|---|---|
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:<br>• Carries out measurements<br>• Determines force, work, energy and power<br>• Solves simple problems on friction<br>• Identifies characteristics of light and sound<br>• Applies general chemistry in experiments |
| 2. Resource Implications | The following resources must be provided:<br>• A well-equipped science laboratory |
| 3. Methods of Assessment | Competency in this unit may be assessed through:<br>• Observation (performance checklist)<br>• Oral<br>• Written<br>• Third party report<br>• Practicals |
| 4. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment. |
| 5. Guidance Information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |