

## APPLY SCIENTIFIC PRINCIPLES

UNIT CODE: CON/OS/PL/CC/04/4/A

### UNIT DESCRIPTION

This unit describes the competence in applying scientific principles. It involves applying principles of: units of measurements, force, work, energy and power, friction, heat, pressure in fluids and mechanical properties of materials.

This standard applies in the construction industry.

### ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA <i>(Bold and italicized terms are elaborated in the Range)</i>
1 Apply principles of units of measurements	1.1 Units of measurements are identified based on task given 1.2 Units are converted based on standard conventions.
2 Apply principles of Force, work, energy and power	2.1 Force, work, energy and power are defined based on standard conventions 2.2 Forms of energy are described based on the state of the matter 2.3 Energy is converted according to scientific principles 2.4 Simple calculations on work, energy and power are solved based on the task requirements
3 Apply principles of Friction	3.1 Friction is defined and interpreted based on standard conventions 3.2 The advantages and disadvantages of friction are identified based on scientific principles 3.3 Simple problems on friction are solved based on task requirements
4 Apply principles of heat	4.1 <b>Sources of heat</b> are identified based on scientific principles 4.2 Effects of heat on matter is identified based on scientific principles 4.3 <b>Methods of heat transfer</b> are identified and interpreted based on scientific principles
5 Apply principles of pressure in	5.1 Density and variation of pressure is defined based on scientific principles 5.2 <b>Laws</b> are identified based on scientific principles

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>(Bold and italicized terms are elaborated in the Range)</i>
fluids	5.3 Simple calculations on pressure in liquids are performed based on scientific principles
6 Apply mechanical properties of materials	6.1 <b><i>Mechanical properties</i></b> are identified and interpreted based on type of material 6.2 Advantages and disadvantages of materials are identified based on use of materials 6.3 Materials are tested based on type of material.

### **RANGE**

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

<b>Variable</b>	<b>Range</b>
1. Sources of heat may include but is not limited to:	<ul style="list-style-type: none"> <li>• Solar</li> <li>• Biomass</li> <li>• Geothermal</li> <li>• Fuel</li> <li>• Electric</li> </ul>
2. Methods of heat transfer limited to:	<ul style="list-style-type: none"> <li>• Conduction</li> <li>• Convection</li> <li>• Radiation</li> </ul>
3. Laws limited to:	<ul style="list-style-type: none"> <li>• Law of floatation</li> <li>• Archimedes principles</li> </ul>
4. Mechanical properties may include but is not limited to:	<ul style="list-style-type: none"> <li>• Malleability</li> <li>• Strength</li> <li>• Hardness</li> <li>• Brittleness</li> <li>• Elasticity</li> <li>• Toughness</li> <li>• Ductility</li> <li>• Electrical conductivity</li> </ul>

### **REQUIRED SKILLS AND KNOWLEDGE**

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

#### **Required skills**

- Solving problems
- Analytical
- Interpretation
- Interpersonal
- Computational skills
- Critical thinking

### Required knowledge

- Construction materials
- Measurement
- Mechanical properties
- Friction
- Force, work, energy and power
- Principles of heat
- Pressure in fluids
- Basic electricity

### EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Applied units of measurements appropriately 1.2 Applied Force, work, energy and power appropriately 1.3 Applied principles of Friction appropriately 1.4 Applied principles of heat appropriately 1.5 Applied pressure in fluids appropriately 1.6 Applied mechanical properties of materials appropriately
2. Resource Implications	The following resources should be provided: 2.1 Samples of construction materials 2.2 Material Testing Laboratories 2.3 Safety equipment 2.4 Computers 2.5 Calculators 2.6 Materials testing tools and equipment
3. Methods of	Competency may be assessed through: 3.1 Written tests

Assessment	<p>3.2 Oral questioning</p> <p>3.3 Observation</p> <p>3.4 Interviewing</p> <p>3.5 Third party reports</p>
4. Context of Assessment	<p>Competency may be assessed individually:</p> <p>4.1 On-the-job,</p> <p>4.2 Off-the-job or a combination of these.</p> <p>4.3 During industrial attachment</p>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

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