

APPLY SCIENTIFIC PRINCIPLES

UNIT CODE: CON/OS/PL/CC/03/5/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, acoustics, pressure in fluids, mechanical properties of materials and electrical principles

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 Sources of heat are identified based on scientific principles 4.2 Effects of heat on matter is identified based on scientific principles 4.3 Methods of heat transfer are identified and interpreted based on scientific principles

ELEMENT	PERFORMANCE CRITERIA <i>(Bold and italicized terms are elaborated in the Range)</i>
5 Apply principles of pressure in fluids	5.1 Density and variation of pressure is defined based on scientific principles 5.2 Laws are identified based on scientific principles 5.3 Simple calculations on pressure in liquids are performed based on scientific principles
6 Apply principles of acoustics	6.1 Sources of sound are identified based on scientific principles 6.2 Effects of sound on surrounding areas is identified based on scientific principles 6.3 Methods of sound insulation are identified and interpreted based on scientific principles
7 Apply mechanical properties of materials	7.1 Mechanical properties are identified and interpreted based on type of material 7.2 Advantages and disadvantages of materials are identified based on use of materials 7.3 Materials are tested based on type of material.
8 Apply electrical principles	8.1 Electrical principles are identified based on scientific principles 8.2 Electrical standards are interpreted based on international standards 8.3 Occupational safety and health practises are identified based on statutory and sector regulations. 8.4 Simple electrical circuits are identified based on international standards.

RANGE

Variable	Range
1. Classification of matter may include but is not limited to:	<ul style="list-style-type: none"> • Solids • Liquids • Gases

2. Sources of heat may include but is not limited to:	<ul style="list-style-type: none"> • Solar • Biomass • Geothermal • Fuel • Electric
3. Sources of sound may include but is not limited to:	<ul style="list-style-type: none"> • Mechanical movements • Fluid flow • Vibrations
4. Methods of heat transfer may include but is not limited to:	<ul style="list-style-type: none"> • Conduction • Convection • Radiation
5. Laws may include but is not limited to:	<ul style="list-style-type: none"> • Law of floatation • Archimedes principles
6. Mechanical properties may include but is not limited to:	<ul style="list-style-type: none"> • Malleability • Strength • Hardness • Brittleness • Elasticity • Toughness • Ductility • Electrical conductivity
7. <i>Electrical principles</i>	<ul style="list-style-type: none"> • Voltage • Current • Power • Magnetism

REQUIRED KNOWLEDGE

- Construction materials
- Measurement
- Mechanical properties
- Friction

- Force, work, energy and power
- Principles of heat
- Pressure in fluids
- Basic electricity

SKILLS

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

EVIDENCE GUIDE

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

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 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 principles of acoustics appropriately 1.6 Applied pressure in fluids appropriately 1.7 Applied mechanical properties of materials appropriately 1.8 Applied electrical principles appropriately
<p>2. Resource Implications</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 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 Assessment	Competency may be assessed through: 3.1 Written text 3.2 Interview 3.3 Oral Questioning 3.4 Practical Tests
4. Context of Assessment	Competency may be assessed on the job, off the job or a combination of these r during Industrial Attachment. 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.

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