APPLY SCIENTIFIC PRINCIPLES

UNIT CODE: CON/OS/BUT/BC/CU/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 ***(Bold and italicized terms are elaborated in the Range)***
1 Apply principles of units of measurements	1.1 Units of measurements are identified based on task given 1.2 Units of measurements are converted based on standard conventions. 1.3 Units of measurements are applied based on work requirements
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
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 are identified based on scientific principles.

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicized terms are elaborated in the Range)*
	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 may include but is not limited to:
1. Classification of matter may include but not limited to:	• Solids • Liquids • Gases
2. Sources of heat may include but not limited to:	• Solar • Biomass • Geothermal • Fuel • Electric
3. Sources of sound may include but not limited to:	• Mechanical movements • Fluid flow • Vibrations
4. Methods of heat transfer may include but not limited to:	• Conduction • Convection • Radiation
5. Laws may include but not limited to:	• Law of floatation • Archimedes principles

6. Mechanical properties may include but not limited to:	• Malleability • Strength • Hardness • Brittleness • Elasticity • Toughness • Ductility • Electrical conductivity
7. Electrical principles may include but not limited to:	• 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.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Applied units of measurements as per work requirements 1.2 Calculated force, work, energy and power based on work requirements. 1.3 Solved problems of friction based on task requirements

	1.4 Applied principles of heat transfer based on task requirements 1.5 Applied principles of pressure in fluids based on task requirements. 1.6 Managed sound based on principles of sound acoustics. 1.7 Tested mechanical properties of materials based on type of material 1.8 Applied electrical standards based on electrical principles
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place. 2.2 Appropriately simulated environment where assessment can take place. 2.3 Resources relevant to proposed activity or task
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: 4.1 On-the-job 4.2 In a simulated workplace setting
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.