

E270 BUILDING AND CONSTRUCTION (YEAR 12) –2008 - 2009

Rationale

Building and Construction is a practical subject designed to give students the opportunity to experience aspects of working with building and construction materials in a number of different contexts.

The subject will focus on the application of current technology in the building and construction industry. Suggested areas include the use of common building and construction materials in carpentry, tiling, bricklaying, welding, glazing, concreting, brick paving and finishing.

Subject Design

This subject stipulates a set of outcomes. These describe what the student can do as a result of studying the subject. On completion of the subject the student must have been provided with at least two opportunities to demonstrate achievement of each outcome.

A set of components is listed under each outcome. These components are specified for the development of each outcome and indicate how students will demonstrate achievement of the outcome in this subject. The teaching/learning program will give coverage to all components in order to ensure each outcome is appropriately addressed.

If schools wish to vary these components they may do so, provided it can be demonstrated that the outcomes are still able to be achieved and that the subject is still assessed through the common assessment framework described for the subject. Proposals for variations must be submitted to the Curriculum Council for approval.

The assessment framework, based on a series of generally defined common assessment tasks, has been stipulated for the subject. Each task measures student performance on a subset of subject outcomes. A generalised set of performance criteria supports the assessment framework.

A procedure for rating student performance on each outcome and allocating grades has also been stipulated.

Subject Outcomes

Within the context of Building and Construction the student is provided with opportunities to meet each of the following outcomes:

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| Outcome 1: Applies the technology process to solve teacher-initiated design problems. |
| Outcome 2: Applies an understanding of pre-building procedures and practices. |
| Outcome 3: Applies concreting skills using a variety of tools, equipment and processes. |
| Outcome 4: Applies bricklaying and brick paving skills using a variety of tools, equipment and processes. |
| Outcome 5: Applies building and construction skills with a variety of timber and hardware. |
| Outcome 6: Applies welding skills using a variety of tools, equipment and processes. |
| Outcome 7: Applies a range of mechanical skills using a variety of tools, equipment and processes. |

Components of Outcomes

Outcome 1: Applies the technology process to solve teacher-initiated design problems.
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The following components amplify the context and meaning of the outcome. The student:

- applies elements of a design process to solve problems
- produces sketches of ideas, models or prototypes
- makes products, models or prototypes
- appraises the design solutions of themselves and others
- prepares budgets and costing.

Outcome 2: Applies an understanding of pre-building procedures and practices.
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The following components amplify the context and meaning of the outcome. The student:

- describes the planning considerations required before commencing building
- demonstrates the procedures for setting out when preparing to construct a building
- demonstrates a systematic approach in calculating 'take off' quantities for a simple structure
- describes the various investigations required in site preparation.

Outcome 3: Applies concreting skills using a variety of tools, equipment and processes.

The following components amplify the context and meaning of the outcome. The student:

- describes and applies appropriate occupational health and safety practices and procedures
- describes and applies the procedure for mixing concrete
- describes and applies the laying and finishing of concrete
- describes the correct application of reinforcing in concrete.

Outcome 4: Applies bricklaying and brick paving skills using a variety of tools, equipment and processes.

The following components amplify the context and meaning of the outcome. The student:

- applies appropriate occupational health and safety practices and procedures
- prepares appropriate mortar mixes
- lays a course of bricks on a bed of mortar
- builds a brick construction e.g. brick pier, pyramid, raked corner
- demonstrates compacting of surface for brick paving
- screeds a level surface for laying brick paving
- demonstrates various brick paving patterns.

Outcome 5: Applies building and construction skills with a variety of timber and hardware.

The following components amplify the context and meaning of the outcome. The student:

- describes and applies appropriate occupational health and safety practices and procedures
- describes and applies different types of joints and materials used in building and construction
- describes and operates various portable power tools employed in building and construction
- describes and uses a range of common fasteners associated with building and construction.

Outcome 6: Applies welding skills using a variety of tools, equipment and processes.

The following components amplify the context and meaning of the outcome. The student:

- describes and applies appropriate occupational health and safety practices and procedures
- describes and applies correct procedure for producing a solder joint
- describes and applies oxygen-acetylene welding
- describes and applies electric arc welding
- demonstrates MIG welding.

Outcome 7: Applies a range of mechanical skills using a variety of tools, equipment and processes.

The following components amplify the context and meaning of the outcome. The student:

- describes and applies appropriate occupational health and safety practices and procedures
- describes and applies basic mechanical knowledge and skills involving engines and drive train systems
- demonstrates an understanding of mechanical sub-systems- lubrication, fuel, cooling and electrical
- demonstrates correct use of mechanical hand tools and equipment.

Common Assessment Framework

The framework outlined below specifies a series of common assessment tasks for this subject. The teacher has the flexibility to select from the Building and Construction outcomes those to be assessed in each task. On the completion of the subject the student must have been provided with at least two opportunities to demonstrate achievement of each outcome.

Each common assessment task measures student performance on a subset of subject outcomes. For each outcome measured in a task, student performance will be rated as Very High (V), High (H), Satisfactory (S) or Not Demonstrated (ND).

Task and Task Description

The term ‘task’ should not be confused with ‘project’. Each task may not be a separate individual project but a broad description of the type of activity that the student is to complete to satisfy the specified outcomes within that task. The organisation and number of projects is up to the individual school, as long as all tasks are covered during the subject.

BUILDING AND CONSTRUCTION		
Task	Outcomes	Task Description
One	The teacher has the flexibility to select from the Building and Construction outcomes those to be assessed in each task.	Construction Complete a range of practical and theoretical exercises incorporating a spectrum of construction materials and processes and techniques.
Two		Building Complete a range of practical and theoretical exercises that demonstrates knowledge of building industry processes.
Three		Fabrication Complete a range of practical fabrication exercises that demonstrates knowledge of fabrication techniques and processes.
Four		Systems Complete a range of practical exercises that demonstrates knowledge of engines, sub-systems and drive trains.

The above set of tasks represents assessable activities that would be undertaken within a range of projects defined by the teacher at the commencement of the subject.

Common Assessment Tasks Booklet

The *Common Assessment Tasks* booklet for this subject further describes each task, and defines parameters for its completion. Schools are free to determine specific assessment details within these parameters. Copies of the booklet are available from the Curriculum Council and are included with the syllabus, on the Curriculum Council website (<http://www.curriculum.wa.edu.au>).

Performance Criteria

Ratings for student performance of each outcome will be based on the following criteria:

Outcome 1: Applies the technology process to solve teacher-initiated design problems.

Satisfactory	High	Very High
The student applies elements of the technology process with teacher-initiated design problems.	The student applies the technology process to solve teacher initiated design problems with developments and varied solutions.	The student independently applies the technology process to a range of teacher-initiated design problems from a range of contexts, with developments and detailed solutions.

Outcome 2: Applies an understanding of pre-building procedures and practices.

Satisfactory	High	Very High
The student describes and applies pre-building procedures to simple building projects, and plans building jobs using pre-building practices.	The student describes and applies pre-building procedures and practices to building projects, and plans detailed procedure lists for building jobs using pre-building practices.	The student independently describes and applies pre-building procedures and practices to building jobs and plans building projects with procedure lists, explaining relevant details and accurate practices.

Outcome 3: Applies concreting skills using a variety of tools, equipment and processes.

Satisfactory	High	Very High
The student describes and applies concreting skills, using a variety of tools, equipment and processes to produce a finish complying with a plan.	The student describes and applies concreting skills, using a variety of tools, equipment and processes to produce a designated finish complying with a plan. The student describes the ratio of materials in the mixture and demonstrates pouring and laying techniques.	The student independently describes and applies concreting skills, using a variety of tools, equipment and processes to produce a specified finish complying to a plan. The student recognises a correct mixture and describes the purpose of the mixture ratio when pouring and laying.

Outcome 4: Applies bricklaying and brick paving skills using a variety of tools, equipment and processes.

Satisfactory	High	Very High
The student applies various bricklaying styles with specified spacings, and conforms to plans.	The student applies various brick laying styles, with two types of joint that conforms to plans.	The student independently applies various brick laying styles with specified spacings, and three types of joint which conforms to plans.
The student lays brick paving in two patterns with level finish and border.	The student lays brick paving in two patterns with a level finish, fall and border.	The student independently lays brick paving in three patterns with a level finish, fall and border.

Outcome 5: Applies building and construction skills with a variety of timber and hardware.

Satisfactory	High	Very High
The student describes and applies building and construction skills to a range of materials, hardware, equipment and machines to produce items to plan, and follows appropriate occupational health and safety practices and procedures	The student describes and applies building and construction skills to a range of materials, hardware, equipment and machines to produce items accurately to plan, and follows appropriate occupational health and safety practices and procedures	The student describes and independently applies building and construction skills to a range of materials, hardware, equipment and machines to produce items accurately to specification, and follows appropriate occupational health and safety practices and procedures

Outcome 6: Applies welding skills using a variety of tools, equipment and processes.

Satisfactory	High	Very High
The student describes and applies welding skills using a variety of tools, equipment and processes to produce accurate joins in metal, and applies appropriate occupational health and safety procedures and practices.	The student describes and applies safe welding skills using a variety of tools, equipment and processes to produce accurate joins in a range of metals, and applies appropriate occupational health and safety procedures and practices.	The student independently describes and applies safe welding skills using a variety of tools, equipment and processes to produce accurate joins in a range of metals to specifications, and applies appropriate occupational health and safety procedures and practices.

Outcome 7: Applies a range of mechanical skills using a variety of tools, equipment and processes.

Satisfactory	High	Very High
The student describes and applies a range of mechanical skills using a variety of tools, equipment and processes in working on engines.	The student describes and applies a range of mechanical skills using a variety of tools, equipment and processes in servicing and tuning an engine, including sub-systems.	The student independently describes and applies a range of mechanical skills using a variety of tools, equipment and processes in servicing, tuning and troubleshooting an engine, including sub-systems and accessories.

Rating Procedure

Before a final grade can be awarded, the final rating achieved for each outcome must be determined. This is done using the following process:

- V is attained when at least 50% of ratings are at a Very High level, and at least 50% of the remainder are at a High level or better.
- H is attained when at least 50% of ratings are at a High level or better, and at least 50% of the remainder are at a Satisfactory level or better.
- S is attained when at least 50% of ratings are at a Satisfactory level or better.
- ND is attained when more than 50% of ratings are at a Not Demonstrated level.

Where a student fails to achieve a final rating of S for an outcome, teachers are encouraged to provide the student with an additional opportunity to demonstrate S if:

- the student has completed all the CATs incorporating that outcome; and
- the student has demonstrated S for that outcome in at least one task.

The additional opportunity should not simply be a repetition of a task, but should be an equivalent task which reflects a change of context in which the task is done.

Professional judgement should then be used to determine whether a final rating of ND or S is appropriate in each situation.

Grading Procedure

At the completion of this subject grades will be awarded in the following manner:

- A Very High in at least 50% of outcomes, and High or better in at least 50% of the remainder.
- B High or better in 50% of outcomes, and Satisfactory or better in the remainder.
- C Satisfactory or better in all outcomes.
- D Satisfactory or better in at least 50% of the outcomes.
- E Not Demonstrated in more than 50% of the outcomes.

A final rating of ND for any outcome will result in a grade of D being awarded.

Specific details giving examples of the combination of V, H and S resulting in different grades can be found in the *Common Assessment Tasks* booklet.

Time Allocation

The subject has been designed to be completed through a structured education program of approximately 120 hours in any suitable contexts and series of learning experiences. Typically the subject will be studied over the period of one school year. For administrative reasons schools wishing to vary this delivery pattern (e.g. over a shorter period or over a longer period up to two school years) are required to notify the Chief Executive Officer of the Curriculum Council.

Subject Completion

Students must complete the school's structured educational and assessment program for a subject in order to be eligible to receive a grade unless there are exceptional and justifiable circumstances. In situations where the school considers that insufficient information has been gathered to justify the award of a grade for the subject, a result of U (for unfinished) should be allocated. The Curriculum Council offers the flexibility for the U to be converted to a grade after the final grades have been submitted. Further details on assessment and grading are provided in Volume I of the Syllabus Manuals.

Resources

Support Material

Support material for this subject, including a resources list can be ordered through the Curriculum Council Publications Catalogue and is available on the Curriculum Council website

(<http://www.curriculum.wa.edu.au>).