

SACE Stage 2 Assessment Calculations – Technical Procedures

1. Overview

1.1. Strategic context

The SACE Assessment and Learning Design Policy states that assessment in a SACE Stage 2 subject is based on the subject's performance standards.

The student's achievement in a Stage 2 subject is reported using the grades A+ to E–.

Because the assessment types of the school assessment component have prescribed weightings, the SACE Board uses a process that enables the application of a numerical weighting to non-numerical grades, A+ to E–.

This paper provides information about the technical procedures the SACE Board uses in managing the Stage 2 assessment and quality assurance processes.

This paper is a companion document to the paper entitled SACE Assessment and Quality Assurance for Board-accredited Subjects Policy.

1.2. Purpose

The purpose of this paper is to describe the procedures that the SACE Board uses to:

- calculate a student's *school assessment grade* (A+ to E–) from their school assessment type grades (A+ to E–), (see section 2)
- calculate a student's *external assessment grade*, (see section 3)
- combine a student's *school assessment grade* (A+ to E–) with the *external assessment result* to create the student's *subject grade* (A+ to E–) (see section 4).

2. Calculating a student's school assessment grade

2.1. Context

The student's school assessment grade is determined by combining the grades allocated by the teacher to each assessment type that make up the school assessment component.

Within each new Stage 2 subject outline, the SACE Board specifies two or three assessment types in the school assessment component and allocates a weighting to each.

The teacher determines and submits the A+ to E– grade for each assessment type with reference to the performance standards.

2.2. Technical procedure

To apply a numerical weighting to a grade-based scale, the SACE Board uses a procedure that assigns a *numerical equivalent* of 15 to 1 to the corresponding A+ to E– grades for each assessment type.

The SACE school assessment grade calculator applies these numerical equivalents to each of the assessment types within the school assessment component. The calculator allocates the weighting for each assessment type according to its relative proportion as prescribed in the subject outline (e.g. 25%, 30%, and 40%).

In the case of a subject with two assessment types, the individual assessment types are converted to a numerical equivalent and then weighted and summed to form the overall school assessment component using the formula:

$$SA = a_1.w_1 + a_2.w_2,$$

where SA is the overall school assessment score, a_1 is the numerical equivalent for assessment type 1, w_1 is the weighting applied to assessment type 1, etc. The individual weights are calculated from the prescribed weightings in the subject outline such that the SA total lies in the range 1 to 15 (i.e. $w_1 + w_2 = 1$).

For example, the school assessment component of Stage 2 Biology is comprised of two assessment types that make up 40% and 30% of the overall subject result. The weightings are calculated from these proportions by the following formulae:

$$w_1 = \frac{40}{(40 + 30)} = \frac{40}{70}, \text{ and}$$

$$w_2 = \frac{30}{(40 + 30)} = \frac{30}{70}$$

Note that $w_1 + w_2 = \frac{40}{70} + \frac{30}{70} = 1$ as required.

Similarly, the formula used to calculate the overall school assessment component for a subject with three assessment types is:

$$SA = a_1.w_1 + a_2.w_2 + a_3.w_3,$$

where the terms used in the formula are as described above, and $w_1 + w_2 + w_3 = 1$.

The school assessment component total is obtained from the appropriate formula above to a grade by rounding the total to the nearest whole number and equating the rounded total to a grade using Table 1.

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E+	E	E-
Numerical equivalent	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

Table 1: Allocation of numerical equivalents to grade levels

Some examples of the results of this procedure for Stage 2 Biology are shown below.

2.2.1 Calculation of numerical equivalents for the assessment types, and corresponding school assessment grade

Extract from SACE school assessment grade calculator

The numerical equivalents for the school assessment component are combined taking into account the weighting of the assessment type. The SACE school assessment grade calculator translates the numerical equivalents to a school assessment grade.

Amanda

$$= 10 \times w_1 + 11 \times w_2 = 10 \times \frac{40}{70} + 11 \times \frac{30}{70} = 10.4 ; \text{ rounds to } 10; \text{ equates to } B-.$$

Brian:

$$= 7 \times \frac{40}{70} + 9 \times \frac{30}{70} = 7.9; \text{ rounds to } 8; \text{ equates to } C.$$

Charlotte:

$$= 7 \times \frac{40}{70} + 6 \times \frac{30}{70} = 6.6; \text{ rounds to } 7; \text{ equates to } C-.$$

Mario:

$$= 11 \times \frac{40}{70} + 13 \times \frac{30}{70} = 11.9; \text{ rounds to } 12; \text{ equates to } B+.$$

It is important to note that these grades are quality assured through the confirming (moderation) process before they are combined with the external assessment grade.

3. Calculating a student's external assessment grade

3.1 Context

For the external assessment component, the scores achieved in the external assessment are allocated grades by an External Assessment Grade Panel. Members of the External Assessment Grade Panel interpret and apply the performance standards to the students' performances in the external assessment (examination, investigation, or performance/product).

3.2 Technical procedure

The SACE Board applies grades and corresponding numerical equivalents to the external assessment component.

In the case of the external assessment component, the type of result that a student receives depends upon the type of external assessment undertaken in the subject.

In the case of subjects with an investigation or a performance/product, the external assessment is marked on a scale of 0 to 30 with reference to the performance standards and grade levels. The investigations and performances/products are double-marked with complementary supervisory procedures. These marks are used in the final subject score calculations.

In the case of subjects with an examination (or similar), the external assessment is marked on a numeric scale and the External Assessment Grade Panel will make judgements regarding the external assessment grade levels assigned to the external assessment scores. These judgements will vary from year to year, and from subject to subject.

For example, the Stage 2 Biology examination is out of 200. The External Assessment Grade Panel may determine that scores between 160 and 180 out of 200 are an A standard for that particular examination. Any student who scored between 160 and 180 for the examination would be awarded an A for the examination component.

Note also that a score that rounds to 14 on the 15 point scale is also equivalent to an A (i.e. scores in the range 13.5 to 14.4). In the case of the Biology example above, this would mean that the range of raw examination marks 160 to 180 would be assigned to final external assessment results in the range 13.5 to 14.4. This example is summarised in the following table:

Examination Score / 200	External grade	External numerical value
180 – 200	A+	14.5 – 15.0
160 – 180	A	13.5 – 14.4
...

These procedures operate for each Stage 2 subject.

An example of the results this procedure may yield for Stage 2 Biology is shown below.

Student	Exam / 200	External grade	External numerical equivalent
Amanda	139	B+	11.7
Brian	103	C	7.7
Charlotte	105	C	7.8
Mario	180	A	14.4

4. Combining school assessment grades with the external assessment grade

At Stage 2, the student's subject grade is determined from the individual assessment types in the school assessment component and grade and scores determined from the external assessment component. The assessment types have a combined weighting of 70% of the total subject result and the external component has a 30% weighting.

The individual assessment type grades (A+ to E-) from the school assessment component are converted to numerical equivalents using the conversion given in Table 1: Allocation of numerical equivalents to grade levels

The numerical equivalents for the assessment types (school assessment component) are combined with the numerical equivalents for the external assessment (external assessment component) (calculated using the procedure in section 3) in the proportions prescribed in the subject outline.

For a subject with two assessment types in the school assessment component, the following formula is used:

$$Total = a_1 \cdot p_1 + a_2 \cdot p_2 + EX \cdot p_{ex}$$

Where a_1 is the numerical equivalents for assessment type 1, p_1 is the weighting for assessment type 1 (given in the subject outline), a_2 is the numerical equivalents for assessment type 2, p_2 is the weighting for assessment type 2, EX is the numerical equivalents external assessment score (obtained using the procedures in section 3), and p_{ex} is the weighting for the external assessment. Note that in all subjects $p_{ex} = 30\%$, and $p_1 + p_2 + p_{ex} = 100\%$.

Similarly, the following formula is used for a subject with three assessment types in the school assessment component:

$$Total = a_1 \cdot p_1 + a_2 \cdot p_2 + a_3 \cdot p_3 + EX \cdot p_{ex}$$

Where the terms used in the formula are as above, and $p_1 + p_2 + p_3 + p_{ex} = 100\%$.

This calculation results in a numerical equivalents for the subject in the range 1 to 15 that will be stored to an accuracy of one decimal place.

The final grade for the subject is obtained by rounding $Total$ to the nearest whole number and equating this to a grade using **Table 1**: Allocation of numerical equivalents to grade levels

The results of this procedure for the four example Biology students used throughout this paper shown below.

	Investigations Folio		Skills and Applications Tasks		External Assessment		Subject	
	Grade	Numerical equivalents	Grade	Numerical equivalents	Grade	Numerical equivalents	Numerical equivalents	Grade
Amanda	B-	10	B	11	B+	11.7	10.8	B
Brian	C-	7	C+	9	C	7.7	7.8	C
Charlotte	C-	7	D+	6	C	7.8	7.0	C-
Mario	B	11	A-	13	A	14.4	12.6	A-

Amanda

$$Total = 10 \times \frac{40}{100} + 11 \times \frac{30}{100} + 11.7 \times \frac{30}{100} = 10.8 ; \text{ rounds to 11; equates to B.}$$

Brian

$$Total = 7 \times \frac{40}{100} + 9 \times \frac{30}{100} + 7.7 \times \frac{30}{100} = 7.8 ; \text{ rounds to 8; equates to C.}$$

Charlotte

$$Total = 7 \times \frac{40}{100} + 6 \times \frac{30}{100} + 7.8 \times \frac{30}{100} = 6.9 ; \text{ rounds to 7; equates to C-}.$$

Mario

$$Total = 11 \times \frac{40}{100} + 13 \times \frac{30}{100} + 14.4 \times \frac{30}{100} = 12.6 ; \text{ rounds to 13; equates to A-}.$$