Criterion B: Inquiring and designing

Maximum: 8

At the end of YEAR 10, students should be able to:

i. explain a problem or question to be tested by a scientific investigation
ii. formulate a testable hypothesis and explain it using scientific reasoning
iii. explain how to manipulate the variables, and explain how data will be collected
iv. design scientific investigations.

NOTE: Sufficient data means: 3 repetitions of 5 varieties of the independent variable in year 7 and 8, and 5 repetitions of 5 varieties of the independent variable in year 9 and 10.

Level of Acheivement		Level Descriptor
0	The student does not reach the standard described in any of the levels below.	
1-2	The student is able to: i. **state** a problem or question to be tested by a scientific investigation ii. **outline** a testable hypothesis iii. **outline** the variables iv. **design** a method, with limited success	☐ The **question** or **problem of investigation** is adequate, but it is expressed using **minimal scientific vocabulary** not based on research. ☐ The hypothesis is broadly defined according to theory. ☐ Variables have been identified and described, but the distinction between them is incorrect or missing. ☐ The **method** does not allow the **effective** development of the investigation. ☐ No reference list is included.
3-4	The student is able to: i. **outline** a problem or question to be tested by a scientific investigation ii. **formulate** a testable hypothesis using scientific reasoning iii. **outline** how to manipulate the variables, and outline how relevant data will be collected iv. **design** a safe method in which he or she selects materials and equipment	☐ The **question** or **problem of the investigation** is described in broad terms, and is based on some research. ☐ The **hypothesis** is **clearly** and **systematically** expressed, but not **scientifically justified.** ☐ **Variables** are correctly identified as independent and dependent, but the controls are incomplete. ☐ The **manipulation** of all the variables is broadly explained. ☐ The method allows for the collection **of relevant data**. ☐ The **method** is safe. ☐ A complete **list of materials**, with their **proper names**, is included. ☐ A **reference list** is included
5-6	The student is able to: i. **describe** a problem or question to be tested by a scientific investigation ii. **formulate** and **explain** a testable hypothesis using scientific reasoning iii. **describe** how to manipulate the variables, and describe how sufficient, relevant data will be collected iv. **design** a complete and safe method in which he or she selects appropriate materials and equipment	☐ The **question** or **scientific problem of the investigation** is described using **scientific vocabulary**, based on some research. ☐ The **hypothesis** is **clearly** and **systematically** expressed, **scientifically justified** using **theoretical** background. ☐ **Variables** are correctly identified as independent, dependent and controlled ☐ The **manipulation, measuring** and **controlling** of all the variables is **described.** ☐ The method allows for the **collection of sufficient and relevant data**. ☐ The **method** is completely clear, safe and logically structured. ☐ A complete **list of materials**, with their **proper names**, is included. ☐ A **reference list** is included in **APA format**.
7-8	The student is able to: i. **explain** a problem or question to be tested by a scientific investigation ii. **formulate** and **explain** a testable hypothesis using correct scientific reasoning iii. **explain** how to manipulate the variables, and explain how sufficient, relevant data will be collected iv. **design** a logical, complete and safe method in which he or she selects appropriate materials and equipment.	☐ The **question** or **scientific problem of the investigation** is explained using **scientific vocabulary**, based on previous research. ☐ The **hypothesis** is **clearly** and **systematically** expressed, **scientifically justified** using the **correct theoretical** background. ☐ **Variables** are correctly identified as independent, dependent and controlled. ☐ The **manipulation, measuring** and **controlling** of all the variables is **well explained**. ☐ The method allows for the **collection of sufficient and relevant data**. ☐ The **method** is completely clear, safe and logically structured. ☐ A complete **list of materials**, with their **proper names**, is included. ☐ A **reference list** is included in **APA format**.