

# Sciences guide

For use from September 2014/January 2015

## Alignment of objectives and assessment criteria

In the MYP, assessment is closely aligned with the written and taught curriculum. Each strand from MYP sciences has a corresponding strand in the assessment criteria for this subject group. Figure 5 illustrates this alignment and the increasingly complex demands for student performance at higher achievement levels.

### C Processing and evaluating

At the end of year 5, students should be able to:

- i. present collected and transformed data
- ii. interpret data and explain results using scientific reasoning
- iii. evaluate the validity of a hypothesis based on the outcome of the scientific investigation
- iv. evaluate the validity of the method
- v. explain improvements or extensions to the method.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard identified by any of the descriptors below.
1–2	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. collect and <b>present</b> data in numerical and/or visual forms</li> <li>ii. <b>Interpret</b> data</li> <li>iii. <b>state</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>iv. <b>state</b> the validity of the method based on the outcome of a scientific investigation</li> <li>v. <b>state</b> improvements or extensions to the method.</li> </ol>
3–4	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. correctly collect and <b>present</b> data in numerical and/or visual forms</li> <li>ii. accurately <b>interpret</b> data and <b>explain</b> results</li> <li>iii. <b>outline</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>iv. <b>outline</b> the validity of the method based on the outcome of a scientific investigation</li> <li>v. <b>outline</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ol>
5–6	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. correctly collect, organize and <b>present</b> data in numerical and/or visual forms</li> <li>ii. accurately <b>interpret</b> data and <b>explain</b> results using scientific reasoning</li> <li>iii. <b>discuss</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>iv. <b>discuss</b> the validity of the method based on the outcome of a scientific investigation</li> <li>v. <b>describe</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ol>
7–8	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. correctly collect, organize, transform and <b>present</b> data in numerical and/or visual forms</li> <li>ii. accurately <b>interpret</b> data and <b>explain</b> results using correct scientific reasoning</li> <li>iii. <b>evaluate</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>iv. <b>evaluate</b> the validity of the method based on the outcome of a scientific investigation</li> <li>v. <b>explain</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ol>

Figure 5

Sciences objectives and criteria alignment



## Sciences assessment criteria: Year 1

### Criterion A: Knowing and understanding

**Maximum: 8**

At the end of year 1, students should be able to:

- i. outline scientific knowledge
- ii. apply scientific knowledge and understanding to solve problems set in familiar situations and suggest solutions to problems set in unfamiliar situations
- iii. interpret information to make scientifically supported judgments.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard described by any of the descriptors below.
1–2	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>select</b> scientific knowledge</li> <li>ii. <b>select</b> scientific knowledge and understanding to <b>suggest solutions</b> to problems set in <b>familiar situations</b></li> <li>iii. <b>apply</b> information to <b>make judgments, with limited success.</b></li> </ol>
3–4	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>recall</b> scientific knowledge</li> <li>ii. <b>apply</b> scientific knowledge and understanding to <b>suggest solutions</b> to problems set in <b>familiar situations</b></li> <li>iii. <b>apply</b> information to <b>make judgments.</b></li> </ol>
5–6	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>state</b> scientific knowledge</li> <li>ii. <b>apply</b> scientific knowledge and understanding to <b>solve problems</b> set in <b>familiar situations</b></li> <li>iii. <b>apply</b> information to <b>make scientifically supported judgments.</b></li> </ol>
7–8	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>outline</b> scientific knowledge</li> <li>ii. <b>apply</b> scientific knowledge and understanding to <b>solve problems</b> set in <b>familiar situations</b> and <b>suggest solutions</b> to problems set in <b>unfamiliar situations</b></li> <li>iii. <b>interpret</b> information to <b>make scientifically supported judgments.</b></li> </ol>

## Criterion B: Inquiring and designing

**Maximum: 8**

At the end of year 1, students should be able to:

- i. outline an appropriate problem or research question to be tested by a scientific investigation
- ii. outline a testable prediction using scientific reasoning
- iii. outline how to manipulate the variables, and outline how data will be collected
- iv. design scientific investigations.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard described by any of the descriptors below.
1–2	The student is able to: <ol style="list-style-type: none"> <li>i. <b>select</b> a problem or question to be tested by a scientific investigation</li> <li>ii. <b>select</b> a testable prediction</li> <li>iii. <b>state</b> a variable</li> <li>iv. design a <b>method with limited success</b>.</li> </ol>
3–4	The student is able to: <ol style="list-style-type: none"> <li>i. <b>state</b> a problem or question to be tested by a scientific investigation</li> <li>ii. <b>state</b> a testable prediction</li> <li>iii. <b>state</b> how to manipulate the variables, and <b>state</b> how <b>data</b> will be collected</li> <li>iv. design a <b>safe method</b> in which he or she <b>selects materials and equipment</b>.</li> </ol>
5–6	The student is able to: <ol style="list-style-type: none"> <li>i. <b>state</b> a problem or question to be tested by a scientific investigation</li> <li>ii. <b>outline</b> a testable prediction</li> <li>iii. <b>outline</b> how to manipulate the variables, and <b>state</b> how <b>relevant data</b> will be collected</li> <li>iv. design a <b>complete and safe method</b> in which he or she <b>selects appropriate materials and equipment</b>.</li> </ol>
7–8	The student is able to: <ol style="list-style-type: none"> <li>i. <b>outline</b> a problem or question to be tested by a scientific investigation</li> <li>ii. <b>outline</b> a testable prediction <b>using scientific reasoning</b></li> <li>iii. <b>outline</b> how to manipulate the variables, and <b>outline</b> how <b>sufficient, relevant data</b> will be collected</li> <li>iv. design a <b>logical, complete and safe method</b> in which he or she <b>selects appropriate materials and equipment</b>.</li> </ol>

## Criterion C: Processing and evaluating

**Maximum: 8**

At the end of year 1, students should be able to:

- i. present collected and transformed data
- ii. interpret data and outline results using scientific reasoning
- iii. discuss the validity of a prediction based on the outcome of the scientific investigation
- iv. discuss the validity of the method
- v. describe improvements or extensions to the method.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard described by any of the descriptors below.
1–2	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>collect and present</b> data in numerical and/or visual forms</li> <li>ii. <b>interpret</b> data</li> <li>iii. <b>state</b> the validity of a prediction based on the outcome of a scientific investigation, <b>with limited success</b></li> <li>iv. <b>state</b> the validity of the method based on the outcome of a scientific investigation, <b>with limited success</b></li> <li>v. <b>state</b> improvements or extensions to the method that would benefit the scientific investigation, <b>with limited success</b>.</li> </ol>
3–4	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>correctly collect and present</b> data in numerical and/or visual forms</li> <li>ii. <b>accurately interpret</b> data and <b>outline</b> results</li> <li>iii. <b>state</b> the validity of a prediction based on the outcome of a scientific investigation</li> <li>iv. <b>state</b> the validity of the method based on the outcome of a scientific investigation</li> <li>v. <b>state</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ol>
5–6	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>correctly collect, organize and present</b> data in numerical and/or visual forms</li> <li>ii. <b>accurately interpret</b> data and <b>outline</b> results <b>using scientific reasoning</b></li> <li>iii. <b>outline</b> the validity of a prediction based on the outcome of a scientific investigation</li> <li>iv. <b>outline</b> the validity of the method based on the outcome of a scientific investigation</li> <li>v. <b>outline</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ol>

Achievement level	Level descriptor
7–8	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. <b>correctly collect, organize, transform and present</b> data in numerical and/or visual forms</li> <li>ii. <b>accurately interpret data</b> and <b>outline</b> results <b>using correct scientific reasoning</b></li> <li>iii. <b>discuss</b> the validity of a prediction based on the outcome of a scientific investigation</li> <li>iv. <b>discuss</b> the validity of the method based on the outcome of a scientific investigation</li> <li>v. <b>describe</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ul>



## Criterion D: Reflecting on the impacts of science

**Maximum: 8**

At the end of year 1, students should be able to:

- i. summarize the ways in which science is applied and used to address a specific problem or issue
- ii. describe and summarize the various implications of using science and its application in solving a specific problem or issue
- iii. apply scientific language effectively
- iv. document the work of others and sources of information used.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard described by any of the descriptors below.
1–2	<p>The student is able to, <b>with limited success</b>:</p> <ol style="list-style-type: none"> <li>i. <b>state</b> the ways in which science is used to address a specific problem or issue</li> <li>ii. <b>state</b> the implications of using science to solve a specific problem or issue, interacting with a factor</li> <li>iii. <b>apply</b> scientific language to communicate understanding</li> <li>iv. document sources.</li> </ol>
3–4	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>state</b> the ways in which science is used to address a specific problem or issue</li> <li>ii. <b>state</b> the implications of using science to solve a specific problem or issue, interacting with a factor</li> <li>iii. <b>sometimes apply</b> scientific language to communicate understanding</li> <li>iv. <b>sometimes</b> document sources correctly.</li> </ol>
5–6	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>outline</b> the ways in which science is used to address a specific problem or issue</li> <li>ii. <b>outline</b> the implications of using science to solve a specific problem or issue, interacting with a factor</li> <li>iii. <b>usually apply</b> scientific language to communicate understanding <b>clearly and precisely</b></li> <li>iv. <b>usually</b> document sources correctly.</li> </ol>
7–8	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>summarize</b> the ways in which science is applied and used to address a specific problem or issue</li> <li>ii. <b>describe and summarize</b> the implications of using science and its application to solve a specific problem or issue, interacting with a factor</li> <li>iii. <b>consistently apply</b> scientific language to communicate understanding <b>clearly and precisely</b></li> <li>iv. document sources <b>completely</b>.</li> </ol>

## Sciences assessment criteria: Year 3

### Criterion A: Knowing and understanding

**Maximum: 8**

At the end of year 3, students should be able to:

- i. describe scientific knowledge
- ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations
- iii. analyse information to make scientifically supported judgments.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard indicated by any of the descriptors below.
1–2	The student is able to: <ol style="list-style-type: none"> <li>i. <b>recall</b> scientific knowledge</li> <li>ii. apply scientific knowledge and understanding to <b>suggest solutions</b> to problems set in <b>familiar situations</b></li> <li>iii. <b>apply</b> information to make <b>judgments</b>.</li> </ol>
3–4	The student is able to: <ol style="list-style-type: none"> <li>i. <b>state</b> scientific knowledge</li> <li>ii. apply scientific knowledge and understanding to <b>solve problems</b> set in <b>familiar situations</b></li> <li>iii. <b>apply</b> information to make <b>scientifically supported judgments</b>.</li> </ol>
5–6	The student is able to: <ol style="list-style-type: none"> <li>i. <b>outline</b> scientific knowledge</li> <li>ii. apply scientific knowledge and understanding to <b>solve problems</b> set in <b>familiar situations</b> and <b>suggest solutions</b> to problems set in <b>unfamiliar situations</b></li> <li>iii. <b>interpret</b> information to make <b>scientifically supported judgments</b>.</li> </ol>
7–8	The student is able to: <ol style="list-style-type: none"> <li>i. <b>describe</b> scientific knowledge</li> <li>ii. apply scientific knowledge and understanding to <b>solve problems</b> set in <b>familiar and unfamiliar situations</b></li> <li>iii. <b>analyse</b> information to make <b>scientifically supported judgments</b>.</li> </ol>



## Criterion B: Inquiring and designing

### Maximum: 8

At the end of year 3, students should be able to:

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

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard identified by any of the descriptors below.
1–2	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>state</b> a problem or question to be tested by a scientific investigation, with <b>limited success</b></li> <li>ii. <b>state</b> a testable hypothesis</li> <li>iii. <b>state</b> the variables</li> <li>iv. design <b>a method, with limited success.</b></li> </ol>
3–4	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>state</b> a problem or question to be tested by a scientific investigation</li> <li>ii. <b>outline</b> a testable hypothesis <b>using scientific reasoning</b></li> <li>iii. <b>outline</b> how to manipulate the variables, and <b>state</b> how <b>relevant data</b> will be collected</li> <li>iv. design a <b>safe method</b> in which he or she <b>selects materials and equipment.</b></li> </ol>
5–6	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>outline</b> a problem or question to be tested by a scientific investigation</li> <li>ii. <b>outline and explain</b> a testable hypothesis <b>using scientific reasoning</b></li> <li>iii. <b>outline</b> how to manipulate the variables, and <b>outline</b> how <b>sufficient, relevant data</b> will be collected</li> <li>iv. design <b>a complete and safe method</b> in which he or she <b>selects appropriate materials and equipment.</b></li> </ol>
7–8	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>describe</b> a problem or question to be tested by a scientific investigation</li> <li>ii. <b>outline and explain</b> a testable hypothesis <b>using correct scientific reasoning</b></li> <li>iii. <b>describe</b> how to manipulate the variables, and <b>describe</b> how <b>sufficient, relevant data</b> will be collected</li> <li>iv. design a <b>logical, complete and safe method</b> in which he or she <b>selects appropriate materials and equipment.</b></li> </ol>

## Criterion C: Processing and evaluating

### Maximum: 8

At the end of year 3, students should be able to:

- i. present collected and transformed data
- ii. interpret data and describe results using scientific reasoning
- iii. discuss the validity of a hypothesis based on the outcome of the scientific investigation
- iv. discuss the validity of the method
- v. describe improvements or extensions to the method.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard identified by any of the descriptors below.
1–2	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>collect and present</b> data in numerical and/or visual forms</li> <li>ii. <b>accurately interpret</b> data</li> <li>iii. <b>state</b> the validity of a hypothesis <b>with limited reference</b> to a scientific investigation</li> <li>iv. <b>state</b> the validity of the method <b>with limited reference</b> to a scientific investigation</li> <li>v. <b>state limited</b> improvements or extensions to the method.</li> </ol>
3–4	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>correctly collect and present</b> data in numerical and/or visual forms</li> <li>ii. <b>accurately interpret</b> data and <b>describe</b> results</li> <li>iii. <b>state</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>iv. <b>state</b> the validity of the method based on the outcome of a scientific investigation</li> <li>v. <b>state</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ol>
5–6	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>correctly collect, organize and present</b> data in numerical and/or visual forms</li> <li>ii. <b>accurately interpret</b> data and <b>describe</b> results <b>using scientific reasoning</b></li> <li>iii. <b>outline</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>iv. <b>outline</b> the validity of the method based on the outcome of a scientific investigation</li> <li>v. <b>outline</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ol>

Achievement level	Level descriptor
7–8	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. <b>correctly collect, organize, transform and present</b> data in numerical and/or visual forms</li> <li>ii. <b>accurately interpret data</b> and <b>describe</b> results <b>using correct scientific reasoning</b></li> <li>iii. <b>discuss</b> the validity of a hypothesis based on the outcome of a scientific investigation</li> <li>iv. <b>discuss</b> the validity of the method based on the outcome of a scientific investigation</li> <li>v. <b>describe</b> improvements or extensions to the method that would benefit the scientific investigation.</li> </ul>



## Criterion D: Reflecting on the impacts of science

**Maximum: 8**

At the end of year 3, students should be able to:

- i. describe the ways in which science is applied and used to address a specific problem or issue
- ii. discuss and analyse the various implications of using science and its application in solving a specific problem or issue
- iii. apply scientific language effectively
- iv. document the work of others and sources of information used.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard identified by any of the descriptors below.
1–2	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>state</b> the ways in which science is used to address a specific problem or issue</li> <li>ii. <b>state</b> the implications of the use of science to solve a specific problem or issue, interacting with a factor</li> <li>iii. <b>apply</b> scientific language to communicate understanding but does so <b>with limited success</b></li> <li>iv. document sources, <b>with limited success</b>.</li> </ol>
3–4	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>outline</b> the ways in which science is used to address a specific problem or issue</li> <li>ii. <b>outline</b> the implications of using science to solve a specific problem or issue, interacting with a factor</li> <li>iii. <b>sometimes apply</b> scientific language to communicate understanding</li> <li>iv. <b>sometimes</b> document sources <b>correctly</b>.</li> </ol>
5–6	<p>The student is able to:</p> <ol style="list-style-type: none"> <li>i. <b>summarize</b> the ways in which science is applied and used to address a specific problem or issue</li> <li>ii. <b>describe</b> the implications of using science and its application to solve a specific problem or issue, interacting with a factor</li> <li>iii. <b>usually apply</b> scientific language to communicate understanding <b>clearly and precisely</b></li> <li>iv. <b>usually</b> document sources <b>correctly</b>.</li> </ol>

Achievement level	Level descriptor
7–8	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. <b>describe</b> the ways in which science is applied and used to address a specific problem or issue</li> <li>ii. <b>discuss and analyse</b> the implications of using science and its application to solve a specific problem or issue, interacting with a factor</li> <li>iii. <b>consistently apply</b> scientific language to communicate understanding <b>clearly and precisely</b></li> <li>iv. document sources <b>completely</b>.</li> </ul>