**Assessment Form: Learning Objective 5**

***Observing, Experimenting, and Modeling: The Scientific and Quantitative View****.*

*The study of the natural world through careful observation, construction and testing of hypotheses, and the design and implementation of reproducible experiments is a key aspect of human experience. Scientific literacy and the ability to assess the validity of scientific claims are critical components of an educated and informed life. Scientific and quantitative courses develop students’ ability to use close observation and interpret empirical data to better understand processes in the natural world. As they create models to explain observable phenomena, students develop their abilities to reason both deductively and inductively.*

Course Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Course Number: \_\_\_\_\_\_\_\_\_\_\_\_

Semester / Year: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Number of students assessed for this report: \_\_\_\_\_\_\_\_

**G5E: Learning Outcome 1:**

**The student demonstrates the ability to use scientific methodologies to study and draw reasonable conclusions about the natural world through detailed observations, carefully recorded data, and data analysis techniques appropriate for their field of study.**

*Assessment instrument:*

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| --- | --- | --- | --- | --- | --- |
| Mastery  Category | 5  Superior | 4  More than satisfactory | 3  Satisfactory | 2  Substandard | 1  Unacceptable |
| Application of scientific methodologies | student demonstrated sophisticated ability to apply scientific methodologies | student demonstrated advanced ability to apply scientific methodologies | student demonstrated satisfactory ability to apply scientific methodologies | student demonstrated limited ability to apply scientific methodologies | student demonstrated minimal or no ability to apply scientific methodologies |
| Number of Students |  |  |  |  |  |
| Draw reasonable conclusions about the natural world | student articulates conclusions about the natural world that are very clearly and effectively supported by methodologies appropriate to the field of study | student articulates conclusions about the natural world that are effectively supported by methodologies appropriate to the field of study | student articulates conclusions about the natural world that are adequately supported by methodologies appropriate to the field of study | student articulates conclusions about the natural world that are only somewhat supported by methodologies appropriate to the field of study | student articulates conclusions about the natural world that are minimally (or not at all) supported by methodologies appropriate to the field of study |
| Number of Students |  |  |  |  |  |

**G5 and/or G5E: Learning Outcome 2:**

**The student can evaluate scientific information and/or scientific texts, and distinguish data or facts from interpretation and opinion.**

*Assessment instrument:*

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| Mastery  Category | 5  Superior | 4  More than satisfactory | 3  Satisfactory | 2  Substandard | 1  Unacceptable |
| Evaluation of scientific information / text(s) | student produced a highly developed, nuanced evaluation of the text(s) | student produced a developed, thoughtful evaluation of the text(s) | student produced a satisfactory, general evaluation of the text(s) | student produced a limited, vague evaluation of the text(s) | student produced minimal or no evaluation of the text(s) |
| Number of Students |  |  |  |  |  |
| Ability to distinguish data / facts from interpretation / opinion | student demonstrated sophisticated, highly developed ability to distinguish data / facts from interpretation / opinion | student demonstrated advanced ability to distinguish data / facts from interpretation / opinion | student demonstrated reasonably consistent ability to distinguish data / facts from interpretation / opinion | student demonstrated inconsistent ability to distinguish data / facts from interpretation / opinion | student demonstrated minimal or no ability to distinguish data / facts from interpretation / opinion |
| Number of Students |  |  |  |  |  |

**G5Q and/or G5E: Learning Outcome 3:**

**Students demonstrate the ability to calculate and analyze empirical data sets and/or demonstrate the ability to model mathematical theory.**

*Assessment instrument:*

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| --- | --- | --- | --- | --- | --- |
| Mastery  Category | 5  Superior | 4  More than satisfactory | 3  Satisfactory | 2  Substandard | 1  Unacceptable |
| Mathematical theory (G5Q) | student demonstrated comprehensive understanding of principles of mathematical theory relevant to the field of study | student demonstrated advanced understanding of principles of mathematical theory relevant to the field of study | student demonstrated fundamental understanding of principles of mathematical theory relevant to the field of study | student demonstrated limited understanding of principles of mathematical theory relevant to the field of study | student demonstrated minimal or no understanding of principles of mathematical theory relevant to the field of study |
| Number of Students |  |  |  |  |  |
| Ability to calculate / analyze empirical data sets | student produced highly developed, attentive analysis of empirical data sets | student produced comprehensive, observant analysis of empirical data sets | student produced fundamental, general analysis of empirical data sets | student produced a limited, vague analysis of empirical data sets | student produced minimal or no analysis of empirical data sets |
| Number of Students |  |  |  |  |  |
| Ability to model mathematical theory (conceptual or real-world application) | student demonstrated sophisticated, highly developed ability to model mathematical theory | student demonstrated advanced ability to model mathematical theory | student demonstrated reasonably consistent ability to model mathematical theory | student demonstrated inconsistent ability to model mathematical theory | student demonstrated minimal or no ability to model mathematical theory |
| Number of Students |  |  |  |  |  |

**Progress and Adaptation:**

*Identify the improvement goals for the last time the course was taught, and compare outcomes. Was there improvement? Were there contributing factors important for the comparison of outcomes?*

*What are the improvement goals for next time the course will be taught? To which outcome(s) will they apply? What is the basis for these choices?*