**Cal State LA Natural Science Rubric**

**Rubric to assess whether individual SLOs NSP- GE B1-3 are met throughout the course**

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| ***Outcome*** | **Beginning** | **Developing** | **Mastery** |
| 1. *Demonstrate an understanding of the principles of scientific inquiry (i.e., the “scientific method”), the nature of science, the potential limits of scientific endeavors, and the value systems and ethics associated with scientific inquiry.* | **States** the elements that defines scientific methodologies.  **Recognizes** ethical challenges in scientific inquiry.  **Defines** hypothesis, theory and law in science. | **Categorizes** and **contrasts** scientific hypothesis, theory, or law.  **Distinguishes** ethical and not ethical scientific inquiry. | **Creates** a scientific explanation based on scientific hypothesis, theories, and laws.  **Formulates** an ethical argument for or against using scientific inquiry. |
| 1. *Demonstrate knowledge of basic scientific principles as they apply to broader concepts (e.g., global climate change, the spread of infectious diseases, etc.), including historical developments of the disciplines and major contributions from various cultures of the world.* | **Lists** the major science disciplines, describes the historical timeline of their development, and recalls the location where first emerged.  **Explains** the basic natural sciences concepts of carbon flow, energy flow, and water cycle. | **Analyzes** the major world problems that can be addressed with science, including population growth, food and water supply, and emerging infectious diseases, etc.  **Compares** and **contrasts** scientific solutions to the world problems including population growth, food and water supply, and emerging infectious diseases, etc. | **Evaluates** graphs based on measurable parameters of broader concepts including population growth, food and water supply, and emerging infectious diseases, etc.  **Predicts** trendsbased on existing scientifically collected data and **evaluates** proposedinterventions for world’s major problems. |
| 1. *Evaluate the credibility of sources of scientific information.* | **Recognizes** scientific information.  **Names** various types of printed and oral scientific information such as blogs, general news, peer reviewed articles, textbooks, as well as conference presentations. | **Categorizes** scientific information in peer-reviewed and non-peer reviewed information.  **Distinguishes** credible sources from unreliable sources of scientific information. | **Evaluates** scientific information with respect to its credibility.  **Chooses** a peer-reviewed article from an authoritative source. |
| 1. *Draw appropriate conclusions based on the analysis of qualitative and quantitative empirical data.* | **Defines** qualitative and quantitative data.  **Explains** the elements of a graph and the types of graphs and **describes** a given graph. | **Compares** and **contrasts** qualitative and quantitative data.  **Analyzes** a data set and **distinguishes** outliers. | **Interprets** a scientific graph taking the number of data points, the data range, accuracy, and precision into consideration.  **Evaluates** public policy decisions based on available data sets. |

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| 1. *Demonstrate an understanding of the value of science in developing a rigorous understanding of the natural world and of the impact of science on societal, environmental, political, economic, and/or technological contexts.* | **Describes** key features of the basic natural science disciplines, namely chemistry, physics, and biology.  **Lists** examples of major break throughs in science that have impacted daily life. | **Examines** how our world would be without the prior scientific contributions.  **Develops** a question that is born out of societal needs and that can be answered with science. | **Assesses** the impact of science on society, environment, politics, economy, and or technology as presented in general news.  **Constructs** a solution for a given problem in the context of society, environment, politics, economy, and or technology with a chosen natural science discipline. |
| 1. *Students successfully completing a science laboratory will be able to demonstrate hands-on skills applying specialized methods and tools of scientific inquiry (such as collecting, analyzing, and interpreting the data, presenting the findings, and using the information to answer questions).* | **Demonstrates** correct and safe techniques while conducting laboratory procedures according to protocol. | **Applies** specialized methods and tools of scientific inquiry (such as collecting, graphing, and analyzing data). | **Interprets** the collected scientific data, present the relevant results, and use the information to answer questions. |
| B3 Interdisciplinary Physical-Biological Science only |  |  |  |
| 1. *Explain that the natural sciences are integrated.* | **Describes** which disciplines are included in the natural sciences. | **Illustrates** how the natural sciences are integrated. | **Evaluates** the integration of natural sciences in today’s society. |
| 1. *Describe elements of the natural sciences that are common to both the physical and the biological sciences.* | **Lists** elements of the scientific process used in the natural sciences.  **States** examples of a testable hypothesis in the natural sciences. | **Compares and contrasts** a scientific question and testable hypothesis from the physical and biological sciences. | **Proposes** how phenomena in the natural sciences can be explained by both the biological and physical sciences. |
| 1. *Demonstrate through examples that many of today’s problems require an interdisciplinary approach for resolution.* | **Identifies** examples of interdisciplinary approaches being used to solve today’s problems. | **Compares** and **contrasts** different disciplinary approaches to address a particular societal problem. | **Proposes** how an interdisciplinary approach in the natural sciences can be utilized to solve the challenge of a societal problem. |