|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NGSS 3 Dimensions** | **Professional (4)** | **Practitioner (3)** | **Apprentice (2)** | **Novice (1)** |
| **Science and Engineering Practices\*** | **Analyzing and Interpreting Data** | Analyzes and interprets exoplanet data completely and accurately in order to identify patterns and to make reasonable and well-supported scientific claims | Analyzes and interprets exoplanet data accurately in order to identify patterns and to make accurate scientific claims | Analyzes and interprets exoplanet data accurately in order to identify patterns and to make scientific claims; analysis or explanation includes minor errors or omissions | Attempts to analyze exoplanet data in order to identify patterns and to make scientific claims |
| **Engaging In Argument From Evidence** | Presents arguments on disciplinary content that are logical, focused and supported with sufficient and relevant data; interpretation of the data makes connections to other contents or disciplines, or draws relevant conclusions to real world applications or problems | Presents arguments on disciplinary content that are logical, focused and supported with sufficient and relevant evidence | Presents arguments on disciplinary content, which are logical and focused, but lack evidence that supports the argument | Presents arguments on disciplinary content, which are unfocused or unsupported with evidence |
| **Obtaining, Evaluating, And Communicating Information** | When conducting independent research, selects multiple relevant, high-quality scientific sources representing a variety of viewpoints, and thoroughly evaluates the evidence and credibility of each sourceCommunicates in a way that is clear and coherent, and in which the development, organization and style are appropriate to the task, purpose and audience | When conducting independent research, selects multiple relevant scientific sources, and evaluates the evidence and credibility of each sourceCommunicates in a way that is clear and coherent, and in which the development, organization and style are appropriate to task, purpose and audience | When conducting independent research, selects a limited number of relevant scientific sources and evaluates their credibility minimallyCommunicates in a way that is clear and coherent, but the organization and style may not be appropriate to the task, purpose or audience | When conducting independent research, relies on one or two relevant sources without evaluating their credibilityCommunicates with some clarity but concepts may be inaccurate or inappropriate as related to the task, purpose or audience |
| **Disciplinary Core Ideas** | **ESS1.A : The Universe and Its Stars** | Communicates the relationships between the life cycle of the stars, theproduction of elements, and the conservation of the number of protons plus neutrons in starsSynthesizes understanding of concepts related to host star type, mass of host star, lifespan, rate of nuclear fusion to support claim of exoplanet habitability | Communicates the relationships between the life cycle of the stars, theproduction of elements, and the conservation of the number of protons plus neutrons in starsExplains how the host star type, mass of host star, lifespan, and rate of nuclear fusion support their claim of exoplanet habitability | Communicates the relationships between the life cycle of the stars, theproduction of elements, and the conservation of the number of protons plus neutrons in starsExplains how the host star type, mass of host star, lifespan, and rate of nuclear fusion support their claim of exoplanet habitability; explanation includes minor errors or omissions | Attempts to communicate the relationships between the life cycle of the stars, theproduction of elements, and the conservation of the number of protons plus neutrons in stars and explain how the exoplanet data supports their claim |
| **ESS1.B: Earth and the Solar System** | Calculates and analyzes the shape of the exoplanet’s orbit based on its eccentricity and makes connections to applies concepts to how the eccentricity affects its habitability | Calculates and analyzes the shape of the exoplanet’s orbit based on its eccentricity and assesses how the eccentricity affects its habitability | Calculates and analyzes the shape of the exoplanet’s orbit based on its eccentricity; analysis or explanation includes minor errors or omissions | Attempts to calculate and analyze the shape of the exoplanet’s orbit based on its eccentricity |
| **PS3.D: Energy in Chemical Processes and Everyday Life** | Applies the concept of nuclear fusion to explain how radiation from the host star could support life on exoplanet and makes connections to how the rate of fusion in host star impacts its lifespan | Explains how radiation from the host star could support life on exoplanet and makes connections to how the rate of fusion in host star impacts its lifespan | Explains how radiation from the host star could support life on exoplanet and discusses how the rate of fusion in host star impacts its lifespan; explanation includes minor errors or omissions | Attempts to explain how radiation from the host star could support life on exoplanet |
| **Crosscutting Concepts** | **Patterns** | Analyzes data to identify patterns in host stars and habitable exoplanets; makes connections between the characteristics of habitable exoplanets and Earth | Analyzes data to identify patterns in host stars and habitable exoplanets; compares the characteristics of habitable exoplanets and Earth | Analyzes data to identify patterns in host stars and habitable exoplanets; analysis or explanation includes minor errors or omissions | Attempts to identify patterns in exoplanet data and makes comparisons between the characteristics of habitable exoplanets and Earth |
| **Scale, Proportion, and Quantity** | Synthesizes information related to scale when evaluating the data of different exoplanets including the distance between objects in space and the exoplanet’s proximity to its host star with concepts related to exoplanet habitability | Analyzes the scale when evaluating the data of different exoplanets including the distance between objects in space and the exoplanet’s proximity to its host star to assess exoplanet habitability | Analyzes the scale when evaluating the data of different exoplanets including the distance between objects in space and the exoplanet’s proximity to its host star to assess exoplanet habitability; analysis or explanation includes minor errors or omissions | Attempts to analyze the scale when evaluating the data of different exoplanets  |
| **Stability and Change** | Applies concepts of stability related to exoplanets and their host stars to explain why their chosen exoplanet could be habitable | Cites evidence related to the stability of exoplanets and their host stars to explain why their chosen exoplanet could be habitable | Explains how the stability of their chosen exoplanets and its host stars suggests that it could be habitable; explanation includes minor errors or omissions | Attempts to explains how the stability of their chosen exoplanets and its host stars suggests that it could be habitable |

\*SEP portion of the rubric above adapted from NOVA OIESS SEP rubric found [here](https://www.nvcc.edu/oiess/_docs/academic-assessment/clo/science-and-engineering-practice-rubric.pdf).

**Mastery Skill Rubrics**

|  |
| --- |
| **Visual Interpretation****I can identify, interpret, apply and synthesize relevant information presented visually.** |
| ***Professional (4)*** | ***Practitioner (3)*** | ***Apprentice (2)*** | ***Novice (1)*** |
| I can synthesize the relevant information with outside knowledge to address a question or solve a problem. | I can accurately identify, interpret and apply relevant information presented visually (in a chart, graph, diagram, image, etc.). | I can identify relevant information and make basic interpretations of the relevant information presented visually (in a chart, graph, diagram, image, etc.). | I can identify relevant information related to a question or problem.  |

|  |
| --- |
| **Claim & Evidence****I can state a detailed claim to answer a scientific question and provide relevant and sufficient scientific evidence to support that claim.** |
| ***Professional (4)*** | ***Practitioner (3)*** | ***Apprentice (2)*** | ***Novice (1)*** |
| States specific, detailed claim regarding complex relationships that accurately and completely answers the scientific question.ANDSupports claim with extensive relevant and varied scientific evidence. | States detailed claim that accurately and completely answers the scientific question.ANDSupports claim with sufficient relevant scientific evidence. | States basic claim that answers the scientific question.ANDSupports claim with some appropriate, but insufficient scientific evidence; may include some inappropriate evidence. | States basic claim that answers part of the scientific question; may provide non-scientific or unrelated evidence. |

|  |
| --- |
| **Scientific Communication****I can clearly, accurately, and completely communicate scientific ideas using scientific language.** |
| ***Professional (4)*** | ***Practitioner (3)*** | ***Apprentice (2)*** | ***Novice (1)*** |
| Fluently and accurately communicates complex scientific information or ideas in a professional manner with consistent scientific language. | Clearly and accurately communicates detailed scientific information or ideas with consistent scientific language. | Communicates mostly accurate scientific information or ideas with some minor errors in scientific language. | Communicates general scientific ideas that are mostly accurate. |