Scoring Guide: Portrait Gallery of the X-Ray Universe

Scoring Criteria	1 Attempted Demonstration	2 Partial Demonstration	3 Proficient Demonstration	4 Distinguished Demonstration
Content Knowledge Understanding of the X-Ray portion of the spectrum and how scientists use that data	Student attempts to describe the x-ray portion of the spectrum or how the data from X-rays are used to understand cosmic objects. Important details are missing or may contain major errors.	Student partially describes the x-ray portion of the spectrum and how the data from X-rays are used to understand cosmic objects. Some important details are missing or may contain minor errors.	Student describes the x-ray portion of the spectrum and how the data from X-rays are used to understand cosmic objects.	Student accurately describes, in detail, the x-ray portion of the spectrum and how the data from X-rays are used to understand cosmic objects. Student shows sophisticated understanding.
Content Knowledge Technology and Tools for Gathering Information about the Universe	Student attempts to describe the Chandra X-ray telescope, how and why it is used, the types of data it provides, and how scientists use that data. Several important details are missing and/or may contain major errors.	Student partially describes the Chandra X-ray telescope, how and why it is used, the types of data it provides, and how scientists use that data. Some important details are missing or may contain minor errors.	Student accurately describes the Chandra X-ray telescope, how and why it is used, the types of data it provides, and how scientists use that data.	Student accurately describes, in detail, the Chandra X-ray telescope, how and why it is used, the types of data it provides, and how scientists use that data. Student shows sophisticated understanding and may provide additional details such as limitations of other tools astronomers use.
Content Knowledge Understanding of vast distances	Student attempts to describe the concept of light years or relates it to the distance of the object being described. Important details are missing and may contain major errors	Student partially describes the concept of light years and relates it to the distance of the object being described. Some important details are missing or may contain minor errors.	Student accurately describes the concept of light years and relates it to the distance of the object being described.	Student accurately describes the concept of light years and uses clear, vivid examples, in addition to the object they identified, to convey the concept of vast distances in space.
Content Knowledge Understanding of a Cosmic Object	Student attempts to describe a cosmic object, as seen through Chandra.. Information is limited and/or may contain major errors.	Student describes a cosmic object, as seen through Chandra, by providing partial information such as formation, composition, or evolution of the object. Some important details are missing or may contain minor errors.	Student clearly and accurately describes a cosmic object, as seen through Chandra, including information such as formation, composition, and evolution of the object.	Student thoroughly and accurately describes a cosmic object, as seen through Chandra, providing details on the formation, composition, and evolution of the object.
Communication Use of a visual representation	Student attempts to create a representation of a Chandra image but fails to capture the details of the	Student creates a representation of a Chandra image that captures most of the details of the object.	Student creates a representation of a Chandra image that accurately captures the details of the object.	Student creates a vivid representation of a Chandra image that accurately captures the details of the object in a

	object and may contain major flaws.			highly visually appealing way.
Communication Explaining concepts clearly	Student is generally ineffective in explaining their exhibit to the general public. Explanation may be confusing or too dense in terminology.	Student is partially effective in explaining their exhibit in terms the general public can understand. Some scientific terminology may be used without explanation.	Student clearly and effectively explains their exhibit in terms the general public can understand. Scientific terminology is used with explanation	Student clearly and effectively explains their exhibit in terms the general public can understand. Scientific terminology is used with explanation and supporting details are rich and vivid.