

star party





# Star Party

## High School Common Core State Standards Alignment



### WHAT STUDENTS DO: Use a model to resolve questions and debate.

Students use a model to create stars from a stellar nebula and track those stars through their life cycles in an attempt to resolve conflicts and answer questions from party attendees. They will collect evidence of star colors, luminosity, solar mass, lifespans, composition, and temperature along their journey.

#### NRC FRAMEWORK/NGSS CORE & COMPONENT QUESTIONS

### WHAT IS THE UNIVERSE, AND WHAT IS EARTH'S PLACE IN IT?

NGSS Core Question: ESS1: Earth's Place in the Universe

#### What is the universe, and what goes on in stars?

NGSS ESS1.A: The Universe and Its Stars

#### INSTRUCTIONAL OBJECTIVES (IO)

*Students will be able to*

- IO1: Compare competing arguments related to the life cycle of stars and evaluate empirical evidence collected as a scientific way of knowing.**

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## 1.0 About This Activity

*How Students Learn: Science in the Classroom* (Donovan & Bransford, 2005) advocates the use of a research-based instructional model for improving students' grasp of central science concepts. Based on conceptual-change theory in science education, the 5E Instructional Model (BSCS, 2006) includes five steps for teaching and learning: Engage, Explore, Explain, Elaborate, and Evaluate. The Engage stage is used like a traditional warm-up to pique student curiosity, interest, and other motivation-related behaviors and to assess students' prior knowledge. The Explore step allows students to deepen their understanding and challenges existing preconceptions and misconceptions, offering alternative explanations that help them form new schemata. In Explain, students communicate what they have learned, illustrating initial conceptual change. The Elaborate phase gives students the opportunity to apply their newfound knowledge to novel situations and supports the reinforcement of new schemata or its transfer. Finally, the Evaluate stage serves as a time for students' own formative assessment, as well as for educators' diagnosis of areas of confusion and differentiation of further instruction. The 5E stages can be cyclical and iterative.

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## 2.0 Instructional Objectives, Learning Outcomes, Standards, & Rubrics

Visit <https://infiniscope.org/lesson/star-party/> for access to the digital learning experience, lesson plans, standards alignment documents, and additional resources.

Instructional objectives and learning outcomes are aligned with

- Achieve Inc.'s, *Next Generation Science Standards (NGSS)*
- National Research Council's, *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*
- National Governors Association Center for Best Practices (NGA Center) and Council of Chief State School Officers (CCSSO)'s, *Common Core State Standards for Mathematics*
- Partnership for 21<sup>st</sup> Century Skills, *A Framework for 21<sup>st</sup> Century Learning*

The following chart provides details on alignment among the core and component NGSS questions, instructional objectives, learning outcomes, and educational standards.

- Your **instructional objectives (IO)** for this lesson align with the Common Core State Standards.
- You will know that you have achieved these instructional objectives if students demonstrate the related **learning outcomes (LO)**, also aligned with the Common Core State Standards.
- You will know the level to which your students have achieved the learning outcomes by using the suggested **rubrics**.

### Quick View of Standards Alignment:

This alignment document provides full details of the way in which instructional objectives, learning outcomes, 5E activity procedures, and rubric assessments were derived through, and align with the Common Core State Standards. For convenience, a quick view follows:

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## WHAT IS THE UNIVERSE, AND WHAT IS EARTH'S PLACE IN IT?

*NGSS Core Question: ESS1: Earth's Place in the Universe*

### What is the universe, and what goes on in stars?

*NGSS ESS1.A: The Universe and Its Stars*

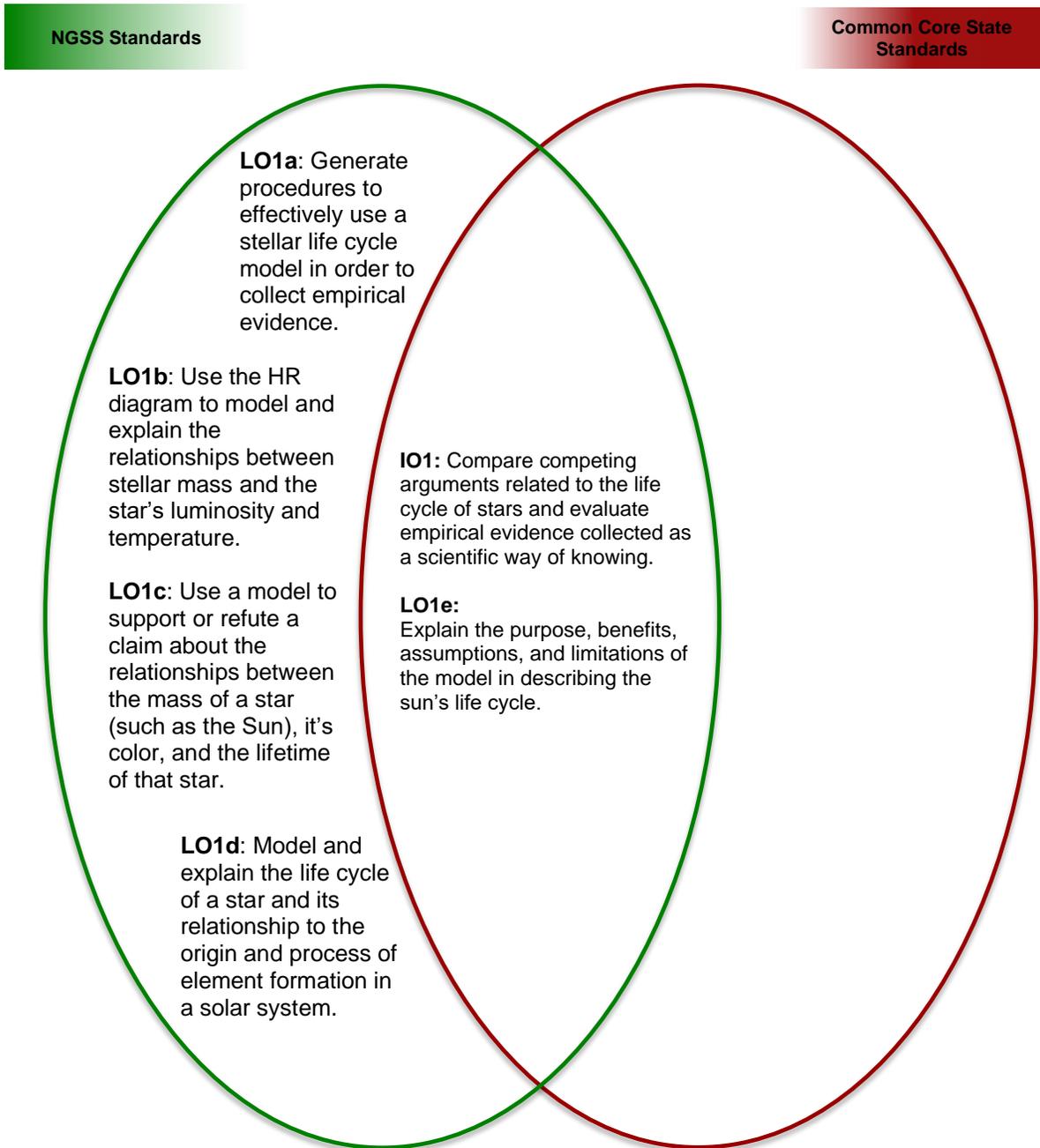
Instructional Objective <i>Students will be able to</i>	Learning Outcomes <i>Students will demonstrate the measurable abilities</i>	Standards <i>Students will address</i>
<p><b>IO1:</b> Compare competing arguments related to the life cycle of stars and evaluate empirical evidence collected as a scientific way of knowing.</p>	<p><b>LO1a:</b> Generate procedures to effectively use a stellar life cycle model in order to collect empirical evidence.</p> <p><b>LO1b:</b> Use the HR diagram to model and explain the relationships between stellar mass and the star's luminosity and temperature.</p> <p><b>LO1c:</b> Use a model to support or refute a claim about the relationships between the mass of a star (such as the Sun), it's color, and the lifetime of that star.</p> <p><b>LO1d:</b> Model and explain the life cycle of a star and its relationship to the origin and process of element formation in a solar system.</p> <p><b>LO1e:</b> Explain the purpose, benefits, and limitations of the model in describing the sun's life cycle</p>	<p><b>WRITING STANDARDS FOR LITERACY IN SCIENCE AND TECHNICAL SUBJECTS:</b></p> <ul style="list-style-type: none"> <li>• <b>Text Types and Purposes</b>  <b>CCSS.ELA-LITERACY.WHST.9-10.2</b>  <b>CCSS.ELA-LITERACY.WHST.11-12.2</b></li> </ul>

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### 3.0 Instructional Objective, NGSS, Common Core, & 21<sup>st</sup> Century Skills Connections

The connections diagram is used to organize the instructional objective addressed in the lesson to establish where it will meet the Next Generation Science Standards, Common Core Standards, and the 21<sup>st</sup> Century Skills and visually determine where there are overlaps in these documents. See Common Core Alignment Document and 21<sup>st</sup> Century Skills Alignment Document for details on their specific alignments.



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#### 4.0 Evaluation/Assessment

Use the *(N) Star Party Alignment Rubric* as a formative and summative assessment, allowing students to improve their work and learn from mistakes during class. The rubric evaluates the activities using the Common Core State Standards.

#### 5.0 References

- Achieve, Inc. (2013). *Next generation science standards*. Achieve, Inc. on behalf of the twenty-six states and partners that collaborated on the NGSS.
- Bybee, R., Taylor, J., Gardner, A., Van Scotter, P., Carson Powell, J., Westbrook, A., Landes, N. (2006) *The BSCS 5E instructional model: origins, effectiveness, and applications*. Colorado Springs: BSCS.
- Donovan, S. & Bransford, J. D. (2005). *How Students Learn: History, Mathematics, and Science in the Classroom*. Washington, DC: The National Academies Press.
- Miller, Linn, & Gronlund. (2009). *Measurement and assessment in teaching*. Upper Saddle River, NJ: Pearson.
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- The Partnership for 21<sup>st</sup> Century Skills (2011). *A framework for 21<sup>st</sup> century learning*. Retrieved March 15, 2012 from <http://www.p21.org/>

**(M) Teacher Resource. Star Party Common Core State Standards Alignment**

You will know the level to which your students have achieved the **Learning Outcomes**, and thus the **Instructional Objective(s)**, by using the suggested **Rubrics** below.

 <b>Common Core State Standards</b>		
<b>Instructional Objective</b>	<b>Writing Standards for Literacy in Science and Technical Subjects (9-10)</b>	<b>Writing Standards for Literacy in Science and Technical Subjects (11-12)</b>
<b>IO1:</b> <b>Compare competing arguments related to the life cycle of stars and evaluate empirical evidence collected as a scientific way of knowing.</b>	<b>Text Types and Purposes:</b> <b>CCSS.ELA-LITERACY.WHST.9-10.2</b> Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. <ol style="list-style-type: none"> <li>Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</li> <li>Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</li> <li>Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</li> <li>Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.</li> <li>Establish and maintain a formal style and objective tone while attending to the norms and conventions</li> </ol>	<b>Text Types and Purposes:</b> <b>CCSS.ELA-LITERACY.WHST.11-12.2</b> Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. <ol style="list-style-type: none"> <li>Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</li> <li>Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</li> <li>Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</li> <li>Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that</li> </ol>
<b>LO1e:</b> <b>Explain the purpose, benefits, assumptions, and limitations of the model in describing the sun's life cycle.</b>		

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	<p>of the discipline in which they are writing.</p> <p>f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p>	<p>responds to the discipline and context as well as to the expertise of likely readers.</p> <p>a. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p>
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**(N) Teacher Resource. Star Party Common Core State Standards Alignment Rubric**

**Related Rubrics for the Assessment of Learning Outcomes Associated with the Above Standard(s):**



**Common Core State Standards**

	<b>Expert</b>	<b>Proficient</b>	<b>Intermediate</b>	<b>Beginner</b>
CCSS.ELA.LITERACY.WHST.9-12.2	Introduces topic clearly, provides a general observation and focus, and groups related information logically; Develops the topic with facts, definitions, concrete details, or other examples related to the topic; Links ideas using words, phrases, and clauses; Use domain-specific vocabulary to explain the topic; Provides a concluding statement related to the explanation.	Introduces topic clearly, provides a general observation, or groups related information logically; Develops the topic with concrete details, or other examples related to the topic; Links ideas using words or phrases; Uses domain specific vocabulary to explain the topic; Provides a concluding statement related to the explanation.	Introduces topic, provides a general observation; Develops the topic with details, or other examples related to the topic; Links ideas using words or phrases; Uses domain specific vocabulary to explain the topic; May or may not provide a concluding statement.	Introduces topic; Develops the topic with details, or other examples, potentially unrelated; Uses specific vocabulary to explain the topic; May or may not provide a concluding statement.

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