

STEAMS Stephen Hawking Project-Based Lesson Plan (6-8)

Objective: The objective of this lesson project is to engage students in grades 6-8 in an exploration of Stephen Hawking's contributions in the world of astrophysics. The project incorporates Science, Technology, Engineering, Arts, Math, and Social Studies (STEAMS) to deepen students' understanding of cosmology and the impact of scientific discoveries.

Key Components

Science (S): Astrophysics and Fundamental Concepts	Topics: <ul style="list-style-type: none">❖ Students delve into advanced concepts of astrophysics, including black holes, the nature of time, and the expanding universe.❖ Explore the fundamental principles that govern the cosmos.
Technology (T): Data Analysis and Astrophysical Tools	Topics: <ul style="list-style-type: none">❖ Utilize technology for data analysis related to astrophysics.❖ Explore astronomical data, use online observatories, and engage with simulation tools to understand celestial phenomena.
Engineering (E): Designing Space Telescopes	Topics: <ul style="list-style-type: none">❖ Engage students in designing hypothetical space telescopes.❖ Consider factors such as resolution, aperture size, and observation capabilities, applying engineering principles to create innovative space exploration tools.
Arts (A): Visualizing the Cosmos	Topics: <ul style="list-style-type: none">❖ Integrate arts by having students create visual representations of complex astrophysical concepts. This could involve drawings, paintings, or

	multimedia projects that convey their understanding of the universe.
Math (M): Mathematical Modeling in Astrophysics	<p>Topics:</p> <ul style="list-style-type: none"> ❖ Explore mathematical equations that describe gravitational forces, celestial mechanics, and the geometry of the universe.
Social Studies (SS): Stephen Hawking's Impact on Cosmology	<p>Topics:</p> <ul style="list-style-type: none"> ❖ Explore the historical and social context of Stephen Hawking's contributions to cosmology. ❖ Discuss how his work has shaped our understanding of the universe and influenced scientific thought.

Project Phases and Timeline

Week 1-2: Science - Introduction to Astrophysics and Stephen Hawking's Legacy	<p>Activities:</p> <ul style="list-style-type: none"> ❖ Introduce the project and its interdisciplinary nature. ❖ Explore advanced concepts in astrophysics and introduce Stephen Hawking as a key figure in the field.
Week 3-4: Technology - Data Analysis and Astrophysical Tools	<p>Activities:</p> <ul style="list-style-type: none"> ❖ Utilize technology for data analysis. ❖ Explore astronomical data, online observatories, and simulation tools to understand celestial phenomena.
Week 5-6: Engineering - Designing Space Telescopes	<p>Activities:</p> <ul style="list-style-type: none"> ❖ Engage in the engineering design process to create hypothetical space telescopes. ❖ Present and defend their designs based on scientific principles.
Week 7-8: Arts Integration - Visualizing the Cosmos	<p>Activities:</p> <ul style="list-style-type: none"> ❖ Create visual representations of complex astrophysical concepts.

	<ul style="list-style-type: none"> ❖ Present their artistic projects, explaining the scientific ideas conveyed through their artwork.
Week 9-10: Math - Mathematical Modeling in Astrophysics	<p>Activities:</p> <ul style="list-style-type: none"> ❖ Explore and present mathematical equations related to celestial mechanics and cosmology.
Week 11-12: Social Studies - Hawking's Impact	<p>Activities:</p> <ul style="list-style-type: none"> ❖ Explore Stephen Hawking's impact on cosmology. ❖ Create projects with presentations, showcasing space telescope designs, visual art, and mathematical models.

Resource Needs

1. Planning and Research:	<ul style="list-style-type: none"> ❖ Materials: ❖ Technology: ❖ Experts/Community Resources:
2. Science Component:	<ul style="list-style-type: none"> ❖ Lab Equipment: ❖ Materials: ❖ Technology:
3. Technology Integration:	<ul style="list-style-type: none"> ❖ Devices: ❖ Software: ❖ Technical Support:
4. Engineering Design and Prototyping:	<ul style="list-style-type: none"> ❖ Materials: ❖ Tools: ❖ Technology:
5. Arts and Design Elements:	<ul style="list-style-type: none"> ❖ Art Supplies: ❖ Multimedia Tools: ❖ Technology:
6. Mathematical Calculations:	<ul style="list-style-type: none"> ❖ Calculators: ❖ Tools: ❖ Technology:
7. Social Studies Connection:	<ul style="list-style-type: none"> ❖ Reference Materials: ❖ Guest Speakers: ❖ Field Trip:

Assessment Criteria

Science:	Understanding of advanced astrophysical concepts.
Technology:	Effective use of technology for data analysis.
Engineering:	Creativity and functionality in designing space telescopes.
Arts:	Quality of visual representations conveying astrophysical concepts.
Math:	Accurate application of advanced mathematical concepts in modeling.
Social Studies:	Understanding of Stephen Hawking's historical impact on cosmology.