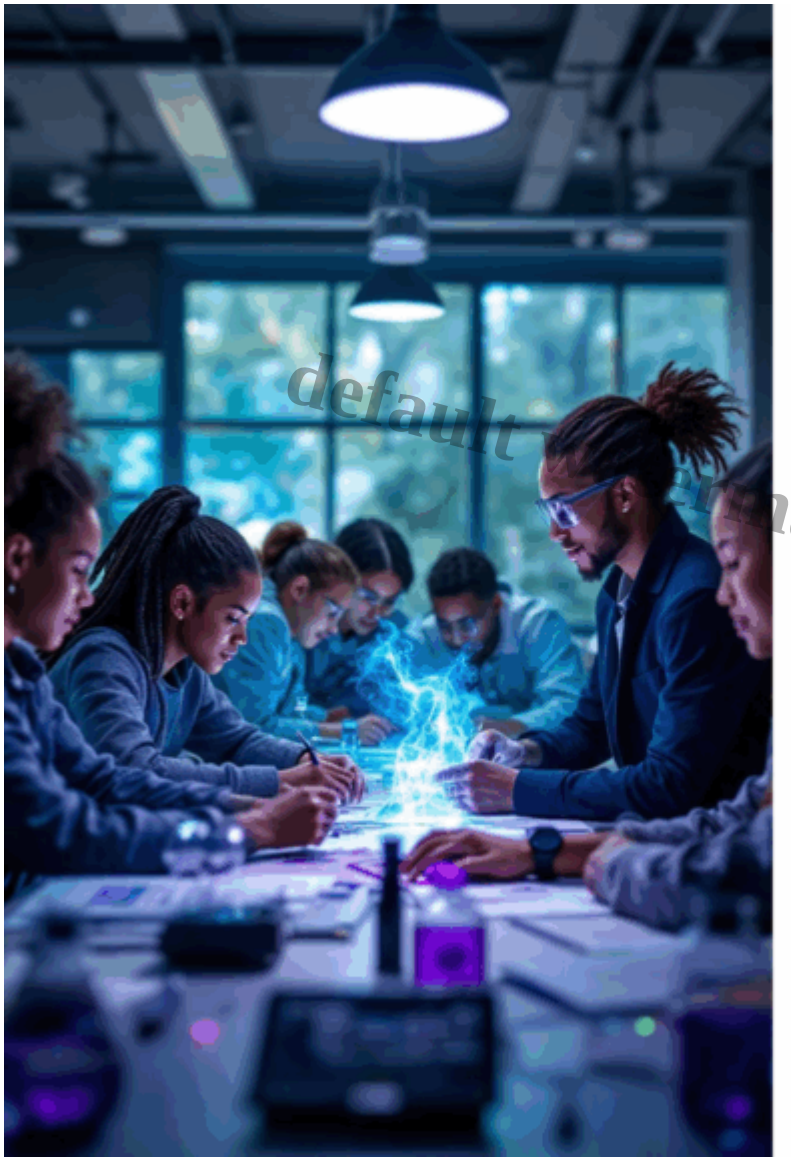
Next Generation Science Standards (NGSS)

Description



Definitions

STEM stands for Science, Technology, Engineering, and Mathematics — an interdisciplinary a
students for real-world challenges.

NGSS, or Next Generation Science Standards, provide a framework for K-12 science educatio
learning to deepen understanding.

PBL (Project-Based Learning) is a teaching method where students gain knowledge and skills
problems and challenges.

Source: National Science Foundation (2014); NGSS Website (2023)

Project-Based Learning in STEM Educ

Definition

Student-centered methodology focused on authentic challenges.

- Learner-driven investigations
- Authentic problem-solving
- Tangible products/solutions

(Dottie Rose Foundation, 2022)

Benefits

Research shows effective

- Increased student mo
- Development of 21st c
- Real-world relevance

Case Study: Climate Change Project Implementation

Local Data Collection

Middle school students gathered temperature, rainfall, and ecosystem data.

Analysis & Problem Definition

Students identified specific climate impacts in their community.

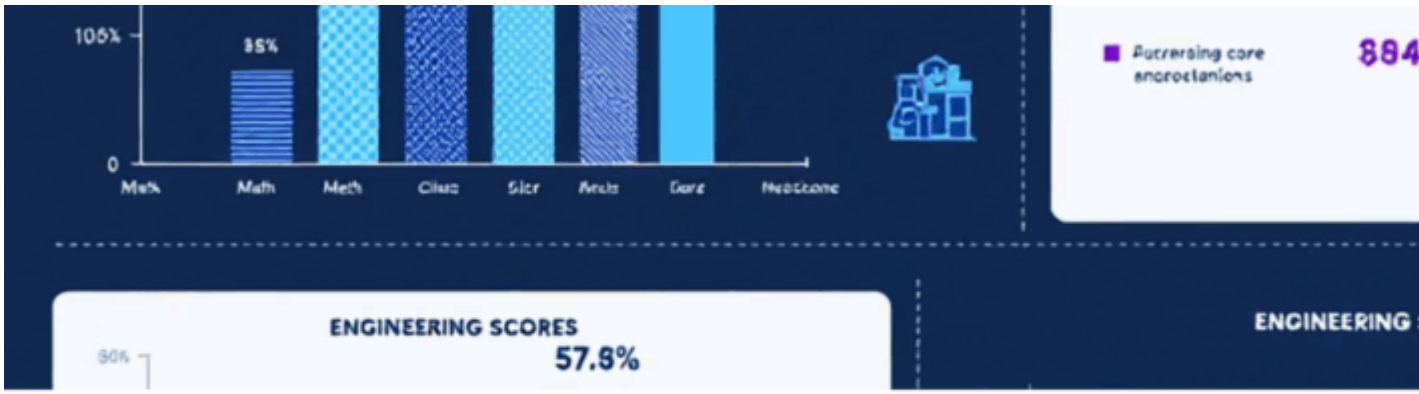
Engineering Solutions

Teams designed renewable energy technologies addressing local needs.

Community Engagement

Partnerships with local scientists enhanced project authenticity.

Assessment showed 23% improved understanding of climate science. (Morrison, 2006)



Research Findings: Impact on Studen

15-20%

Achievement Gain

Improvement in standardized assessments

31%

Engagement

Increase in student participation metrics

Studies show reduced achievement gaps for historically marginalized students. (Morrison, 200

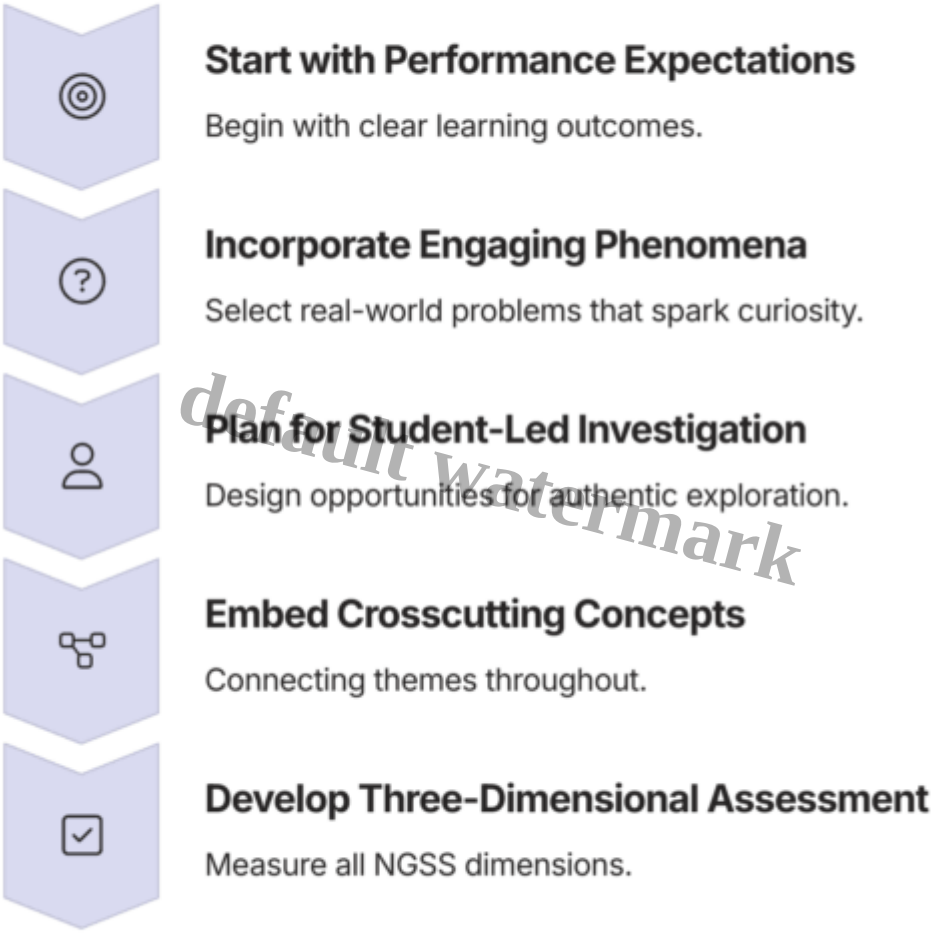
Three Dimensions of NGSS

Science and Engineering Practices

Skills and activities scientists and engineers use, like asking questions, planning investigations, analyzing data, and designing solutions. *Example:* Students might design a simple water filter to learn about clean water and test how well it works.

Source: Next Generation Science Standards (NGSS) Website, 2023

Designing NGSS-Aligned STEM Lesso



Krajcik, J. S., & Delen, I. (2017)

NGSS 3-Dimensional Assessment

The Next Generation Science Standards (NGSS) emphasize three-dimensional assessment to
understanding of science.

This approach measures students' mastery of:

Science and Engineering Practices	Skills involving inquiry, ex • How did you design ar hypothesis?
Crosscutting Concepts	Themes that connect vari • What patterns did you phenomena?
Disciplinary Core Ideas	Foundational scientific pri • Can you explain the pr concept?

Krajcik, J. S., & Delen, I. (2017)

Overcoming Implementation Challeng

Time Constraints

Block scheduling increases PBL success significantly. Start with flexible time blocks for project work.

Resource Limitation

Effective programs requi
classroom. Seek grants a

Assessment Methods

Portfolio-based evaluation aligns with NGSS performance expectations. Include both process and product assessment.

Teacher Training

Most successful implem
professional developmer

Krajcik, J. S., & Delen, I. (2017); Thomas, J. W. (2000).

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Category

1. Uncategorized

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