The Vision and Design of Elementary STEM/SPARK in Pennsbury

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As a result of

The Pennsbury School District Comprehensive Community Survey:

WE ASKED.

YOU SPOKE.

WE LISTENED.
STEM IS EQUITY FOR ALL
What is STEM in K-12 Education?

**STEM is:**

**LITERACY** - competence or knowledge in a specified area.

**INTERDISCIPLINARY** - blending learning through integration of subjects and rooted in anchors and standards.

**TRANSDISCIPLINARY** - authentic and relevant to the real world and application to problem solving.

**INQUIRY BASED** - phenomena, question posing, design, testing, failing, problem solving

**STEM is NOT:**

- STEM CELLS
- All Projects
- Makerspace
- Scientific Method/ STEM Fair
- Only for after school enrichment...
Elementary STEM: SPARK

STEM through Perseverance, Application, Resilience, and Kinetic Knowledge

PLTW Launch, Genius Hour, 21st Century Skills

Inspiring, Engaging, Empowering

- Tap into exploratory nature
- Engage students in learning that feels like play
- Encourage students to keep discovering
- Develops a design thinking mindset (Fail Forward)
- Begin the pathways of computer science, engineering, and biomedical science
Elementary STEM

PLTW: Launch
<table>
<thead>
<tr>
<th>Grade</th>
<th>Units of Study</th>
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<tbody>
<tr>
<td>K</td>
<td>- Spatial Sense &amp; Coding</td>
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<td></td>
<td>- Floating &amp; Sinking</td>
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<tr>
<td>1</td>
<td>- Animals &amp; Algorithms</td>
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<td>- Pushes &amp; Pulls</td>
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<td>- Animal Adaptations</td>
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<td>- Animal &amp; Plant Engineering</td>
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<td>- Properties of Matter</td>
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<td>- Form &amp; Function</td>
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<td>4</td>
<td>- Computer Systems</td>
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<td>- Human Brain</td>
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<td>5</td>
<td>- Robotic Automation &amp; Challenge</td>
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<td>- Infection Detection &amp; Simulation</td>
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THE ENGINEERING DESIGN PROCESS

DEFINE the problem
IDENTIFY constraints on your solution (e.g. time, money, materials) and criteria for success
BRAINSTORM multiple solutions for the problem
SELECT the most promising solution

COMMUNICATE your solution
ITERATE to improve your prototype
TEST and evaluate your prototype

PROTOTYPE your solution
Kindergarten Example: Spacial Space and Coding

- Inquiry Based Problem Solving
- Directional Movement
- Interactive Robots
- Abstract Reasoning & Mathematical Modeling
- Coding Foundation
- Engineering Design Process

![Children engaged in coding activity]
Grade 5 Example: Robotics and Automation Challenge

Engineering Design Process

Reason Abstractly and Quantitatively

Mechanical Reasoning

Influence on Society

Computer Programming

Building Robots
Genius Hour isn't just a time for students to choose what they want to learn. It's time for them to find themselves in their creative work.
Curricular Connections

Second Steps

Literacy

Coding Transdisciplinary

Career Readiness

Community Outreach
WHY STEM, WHY NOW?