Synthesis Snapshot
Active STEM

Overview

For just over two weeks, **The Teachers Guild** asked a national network of educators to share stories and insights to help us answer this question:

> **How might we cultivate curiosity and problem solving in our students through active and authentic STEM?**

Students today embody our best hopes for tomorrow's workforce, democracy, and globe. They need better-than-ever know-how in science, technology, engineering, and math (STEM) to produce the big ideas that will solve our biggest challenges. And those students need authentic STEM learning experiences to prepare them for the future. That's why we've partnered with 100Kin10 and a number of other organizations dedicated to this topic to ask educators to share and collaborate on their ideas to bring Active STEM to their classrooms.

Over 50 educators contributed insights to help us define these five opportunity areas. Each opportunity area represents a pathway to bring about active STEM to K12 classrooms.

Tensions

Standalone classrooms	———	An interdisciplinary approach
Studying the past (inventors and scientists)	———	Creating the future
Content that a student masters	———	Mindset that a student applies (and uses continuously to learn about themselves)
Prescribed standards	———	Living and dynamic real-world challenges

Opportunity areas:

BRING IN THE REAL WORLD

- How might we authentically apply STEM to real-world questions and contexts so students can make real change in the world, now and in the future?

IGNITE STUDENT-LED LEARNING

- How might we make STEM more student-led, using students' creativity and curiosity as the driver for exploration and learning?

ENRICH WITH DIVERSE CONTENT

- How might we develop STEM lessons that are rich interdisciplinary experiences, in which students can use knowledge from across disciplines?

TINKER ALONGSIDE STUDENTS

- How might we allow students to discover STEM through tinkering, experimentation, and hands-on learning?

DEVELOP CRITICAL THINKING

- How might STEM open up process-driven learning to better prepare students to solve complex problems and develop into future inventors of new solution?

THEME 1

Bring in the real world

How might we authentically apply STEM to real-world questions and contexts so students can make real change in the world, now and in the future.

What we heard:

"We can't just teach our students about inventors and scientists like Edison and the Wright brothers, we have to make them into those innovators and scientists. No greater subject allows for this process than STEM."
- Sara Freeman, *Middle School Teacher, Sacramento, CA*

Provocations:

- **What if students applied their knowledge to redesign the waste system (in their school or city)?**
- **What if students make appendages for amputees?**

THEME 2

Ignite student-led learning

How might we make STEM more student-led, using students' creativity and curiosity as the driver for exploration and learning?

What we heard:

"I have learned that my students' creativity, imagination and innovation are boundless, and, I can *ALWAYS* count on students to use those skills to save a lesson that, despite my best efforts to prepare, goes off the rails!"
- **Kevin Jarret**, *Educator, Northfield, New Jersey*

"Too often in education our students are robbed of their curiosity."
- **George Phillip**, *High School Global Studies Teacher, South Bend, Indiana*

Provocations:

- **What if students learn about cellular biology with VR?**
- **What if the mysteries of Mars are brought into classrooms and explored?**

THEME 3

Enrich with diverse content

How might we develop STEM lessons that are rich interdisciplinary experiences, in which students can use knowledge from across disciplines?

What we heard:

[When I started] seeing learning as a whole rather than in parts, my students were more engaged and stopped asking me " Are we still...." but questions about what they were learning and what they could be learning!
- **Susan Said**, *Learning Coach, Houston, Texas*

Provocations:

- **What if students create podcasts on their STEM curiosities?**

THEME 4

Tinker alongside students

How might we allow students to discover STEM through tinkering, experimentation, and hands-on learning?

How might we position ourselves as learners alongside our students?

What we heard:

"If we expect our students to be creative, solve problems, and design their way out of our biggest problems, we as educators must be willing to go there too."
- **Erin Quinn**, *Learning Coach, Calgary Canada*

Provocations:

- **What if students prototype solutions for extreme affordability?**

THEME 5

Develop critical thinking

How might STEM open up process-driven learning to better prepare students to solve complex problems and develop into future inventors of new solutions?

How might STEM become an opportunity to teach students about themselves as learners and problem solvers?

What we heard:

"I realized all the kids learned and applied their learning in different ways. I then started to create activities in which the students could express what they learned using different modes."
- **Maria Reza**, *Elementary Teacher, Houston, Texas*

Provocations:

- **What if students in classrooms and astronauts in space exchange ideas?**
- **What if students snd game designers work together to create the future of gaming?**