STEM-ifying Your Lessons

By Kristina Stem
HELLO!

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CAST Region 1 Elementary Rep
STEM for All!
Culture of STEM
STEM is Everywhere

With lots of examples and linked resources.
STEM for ALL!

☑ Every Class.
☑ Every Kid.
☑ No exceptions.
STEM is a culture of helping learners solve problems. @stemboss #springvirtcon You can't buy it in a box. :) 

STEM is not something that happens in just one class it's a culture 🙌 @stemboss #DESTEM #UCPSstem

Mrs. Stem
@ErieStem

STEM is a way to think... a way to process information.... a way to create... a mindset. YES!

Discovery Education 🌟 @DiscoveryEd

"STEM is not a class, it's a culture." @stemboss #DESTEM
#MondayMotivation #STEMchat
STEM is more than the content, more than the hype. **STEM is a MINDSET!**

**STEM is a Culture.**

STEM is a purposeful and intentional way to DO. Regardless what, where, or who you teach, you are already a person who does STEM!! You already think, question, practice, play, and work like a STEmist...
Mega-Skills for STEM

- Problem Solve
- Reason
- Model
- Adapt
- Communicate

Thinking Strategies for STEM

- Use Background Knowledge (schema)
- Question
- Infer
- Determine Importance
- Visualize
- Synthesize
- Monitor for Meaning

Plus... They Share Their Thinking!

As a teacher - YOU DO ALL OF THIS! YOU STEM!
Summary of STEM Big Ideas

- **Details are used to Identify, Compare, and Contrast**
  - Right tool for the right job
  - Evidence is used to support

- **Change is a Process**
  - Some changes are cyclic
  - Some changes are cumulative

- **Patterns, Interactions/Relationships, and Transformations**
  - Are observable
  - Can be used to predict outcomes and draw conclusions

- **Everything is Connected**

Cool models of the interconnectedness of things by Dominic Walliman: https://dominicwalliman.com/
Yes. You do STEM.
Yes. You know STEM.

But do you have a STEM Culture in your teaching space?
How you can up your STEM game?
I STEM. I've got the mindset, just not the time!

How do I make STEM part of my day?

- Speak with Language that models STEM Culture.
- Make STEM Moments and Routines
- Allow for Structured Play
- Practice PBL & Design Thinking
- Leverage your STEM mindset to *really* celebrate the practices, thinking strategies, and character traits that develop great thinkers.

Let’s explore a little of each of these...
Language that Models STEM Culture

You must be worn out from all that hard work. Let's switch gears to something easier.

I see you working hard, showing lots of effort and persistence. Way to grow!

My, you are quick! Look how smart you are! Wow! The solutions are coming easily to you! You're really good at this!

What great effort you are putting into this work! I love your stamina - the way you are sticking with it! I'm impressed to see you've tried different strategies to solve this! What great thinking!

Great question. Keep asking good questions.

That's a great mathematician (or scientist, or engineer) question. Being curious makes you powerful.

I don't know. How about you look it up and when you find out, teach me what you learned.

What questions do you have about this?

What is interesting to you about this?

What else do you wonder?

Today, class, we are going to...

Today, scientists, we are going to explore...

I like how I see everyone working on solving this problem.

I like how I see every mathematician using strategies to solve this problem.

I really like how you are working together as a team.

Scientists collaborate. I really like how you are acting like scientists and working together to learn.

Get out your magic fingers to help get the projector working.

There must be some technical reason why the projector isn't working. Do any of my problem solvers have any ideas.

What connections can you find?

STEM is everywhere. What STEM connections can you find?
Making STEM Moments

Tell a personal story about STEM in your world.

“You probably noticed I dripped mustard on my white shirt yesterday... and I'm proud to tell you that this morning, I used my super-chemistry skills to successfully remove any evidence of my clumsiness! Physics (and mustard) won yesterday but Chemistry won today!”

Model how you are a problem-solver.

“You remember how my projector has been glitchy for a while... Well, I finally figured it out! I thought it was cord - it usually is - so I jiggled it and checked the connections, but that didn't help. I even swapped it out for a new one but that didn't do anything either. And as I went to investigate more, I noticed that bulb didn't look right. I was able to request a new one and it's here and the projector seems good as new!”

Share how you are a lifelong learner.

“This past weekend, I was at the Colorado Science Conference with a bunch of fabulous science teachers all across Colorado, and I got to hear the Colorado Teacher of the Year, Autumn Rivera, give a talk and it was SO cool how through her presentation she wove in the States of Matter - the same States of Matter you're learning about right now - into her lesson. She talked about how sometimes we are like rigid solids and other times more fluid like liquids and even times when we get more energy and behave like gases. I was thinking of you the whole time!”

Ask thoughtful, deep, answerable questions.

“Ok, we have a little time before we need to go. I'm going to give you a minute to think about it and gather your thoughts and then you're going to tell your tables: - From original source to your mouth, what do you think was the journey of the last food you consumed.”
Making STEM Routines

- Curiosity Researcher
- Tech Squad
- Builder/Fixer/Problem-Solver
- Statistician/Data Visualizer
- Math and Science Vocab All Around
- Line Games
- Math Games as Reward Time
- Element/Invention/Scientist of the Week/Month
- STEM Current Events or Ethical Dilemma

- STEM Center/Station
  - Structured Builds
  - Creative Builds
- Builds/Models for Understanding
  - Reviews
  - Assessment
  - Intro

Have an easily accessible collection of “stuff” (TP rolls, tape, pipe cleaners, clean recyclables) to build with.
Structured Play

"Play is often talked about as if it were a relief from serious learning. But for children, play is serious learning."
—Mr. Rogers

Play is the highest form of research
Albert Einstein

Give:
Limited Time.
Any Kind of Stuff.
A Topic.
High Expectations.

AND GO!!!!!
Although we are naturally curious, STEM takes explicit instruction, practice, and experience.

Big PBLs and Big Design Thinking Challenges are AWESOME.

Little bits of them are, too!
Celebrate the practices, thinking strategies, and character traits that develop great thinkers and learners.

Iterate! Try Again! Draft! Improve! Respawn! Rehearse! Repeat! Redo! Revise!

Mistakes and Struggles

Clear evidence from neuroscience & education
• The best times for our brains are when we are struggling & making mistakes

Maya Lin
Finding Balance Award
Examples

**I've had, the time of my lines...**

Task: Arrange a set of cards on the meter stick from oldest to youngest.

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**NATURE SCAVENGER HUNT**

*HINT: Have someone hold the clue card in focus in the picture so we can make a digital book of the treasures you found.*

Bring a clipboard, pencil, with checklist, clue cards and camera! Let's GO!
Good Books
THANKS!

Curious about more?
Wanna collaborate?!

You can find me at

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