

2023

H-STEM Infusions in Lower-Level General Education Courses

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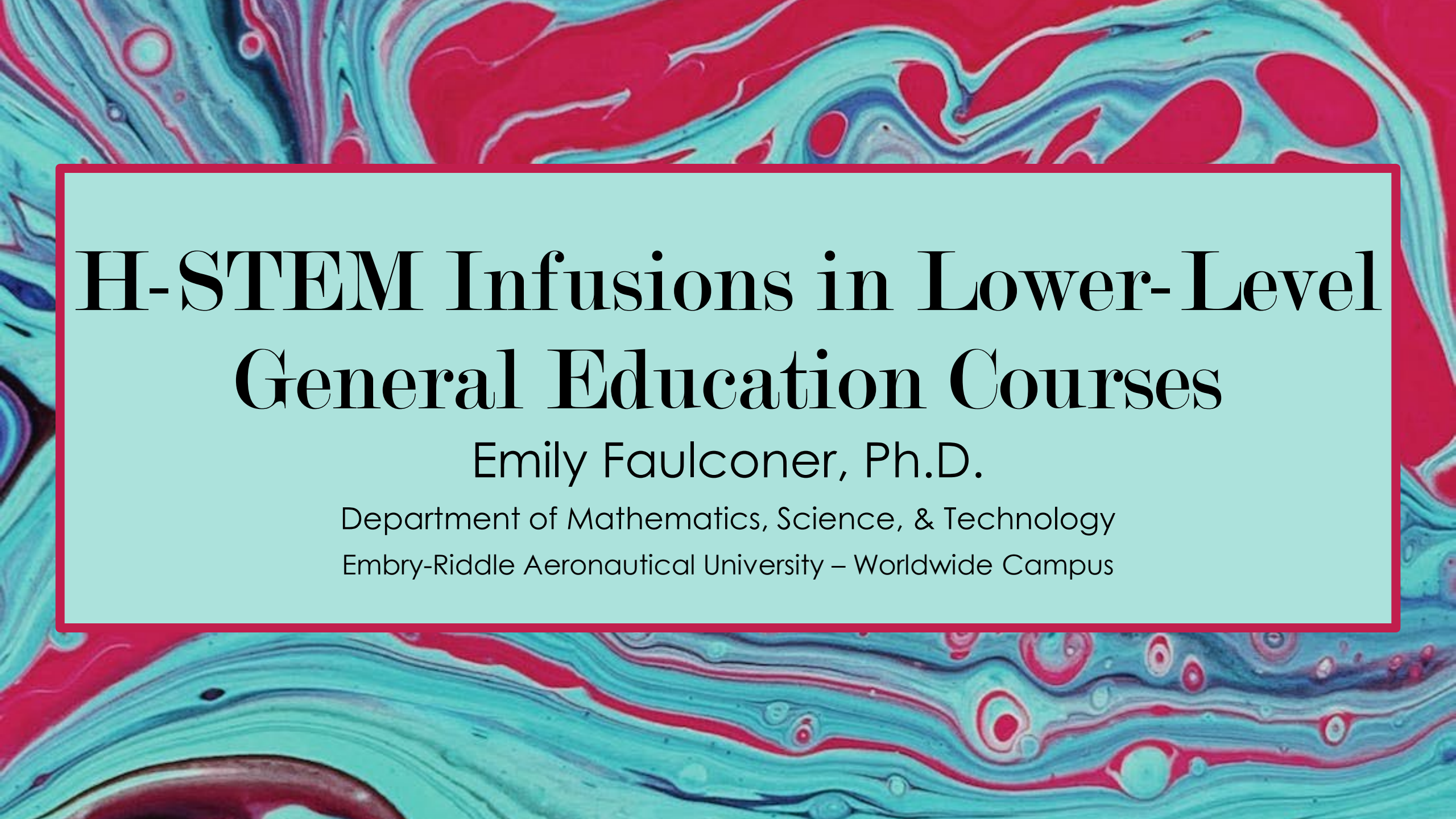


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H-STEM Infusions in Lower-Level General Education Courses

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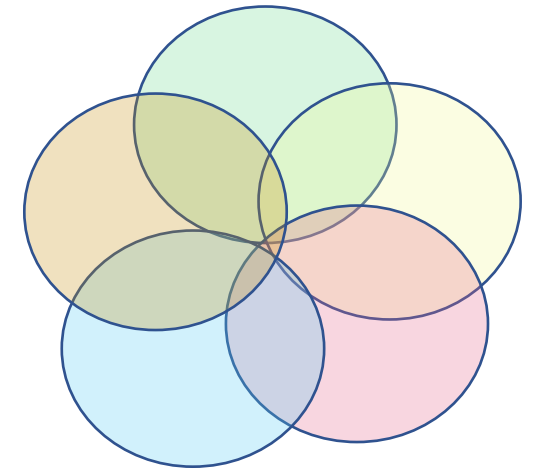
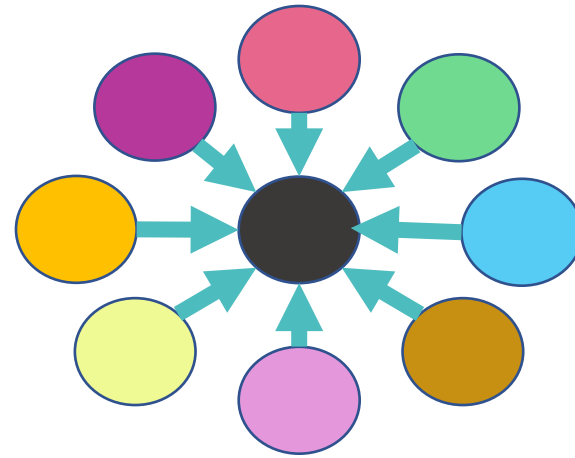
Integrated STEM is an accepted best practice.

Cooperative Learning

Real World Context &
Problem-Centered

Inquiry- & Design-
Based Learning

Multi-and Inter-
Disciplinary Content



Real world problems are often complex.



February 2023 train
derailment in East
Palestine, Ohio

vinyl chloride
butyl acrylate
isobutylene

2000



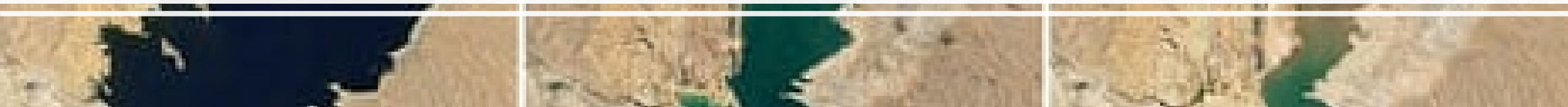
2021



2022



“When we try to pick out anything by itself, we find it hitched to everything else in the Universe”



There is a need for integration of **non-STEM** disciplines to understand these problems.



U.S. – Mexico
relations

Impacts to local
populations

Reduced
recreational access

Filmography and
Photography

Historical context of
dam construction

Various disciplines bring unique perspectives and skills.

Table 1: Comparison of Skills for Problem Solving across Disciplines (Alkhatib 2019; Kelley and Knowles 2016; Nurdyansyah et al. 2017)

Core Skill for Problem Solving	Disciplinary Skill			
	Science	Technology & Engineering	Mathematics	Humanities Meta-Discipline
Understanding a problem by ...	making observations and generating questions	identifying criteria and constraints	creating abstractions of a situation, represented as symbols	identifying the key elements of the problem
Plan an investigation by ...	developing an explanation (hypothesize)	analyzing existing solutions	looking for solution entry points	questioning assumptions and identifying existing information
Appropriate tools ...	strategically	strategically	strategically	strategically
Perform investigation by ...	systematic experimentation and modeling	designing and running models	logic and reason	organizing information
Iteration towards ...	understanding	a good enough solution	generalized models and proof	interpretation
Analyze data ...	using logical and quantitative thinking	using quantitative thinking to locate optimal design	using quantitative thinking	looking for a pattern using mixed methods

Small infusions are an easy starting place for blending humanities into STEM general education.

Introduction to Chemistry



Bacon & Gunpowder



**Intro to Environmental
Science**



The Blue Marble

Earth's Hydrosphere

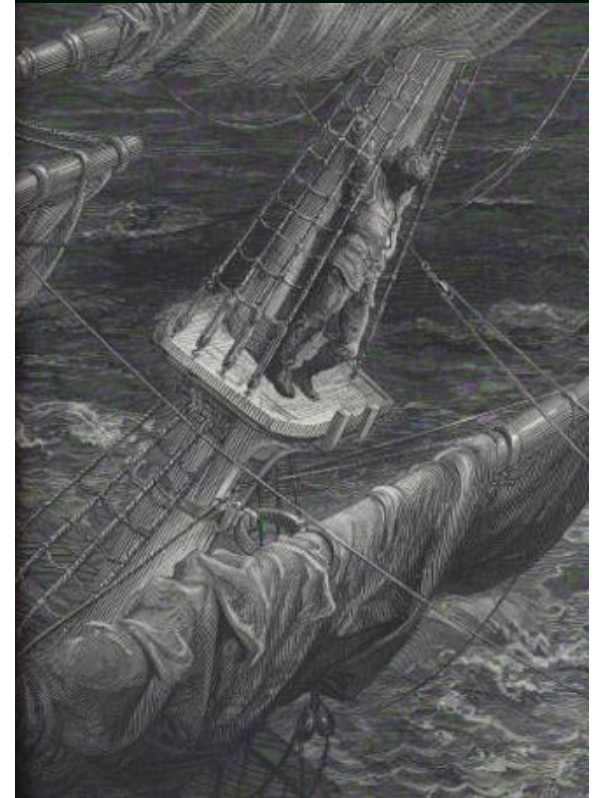


**Water, Water
Everywhere**

**Water Pollution &
Treatment**



**Nor Any Drop to
Drink**



Course videos are another area for infusions.

Take reddish rich Virgin Earth in ♃, impregnate it with ☉, ☽, serene and dew, till the end of *May*: Then imbibe sprinklingly with dew gathered in *May*, and dry in ☉, expose all Night to the ☽ and Air, securing it from Rain. Still when it is dry, imbibe and turn the Earth often. Continue this till ☊mation. The hot ☉ (especially in the Dog-days) will make a pure Salt shoot up, which mingle back into the Earth, by turning it all over. Then distill by graduated Δ as *A. F.* forcing all the Spirits

An Explication of the Characters which are used in this Book.

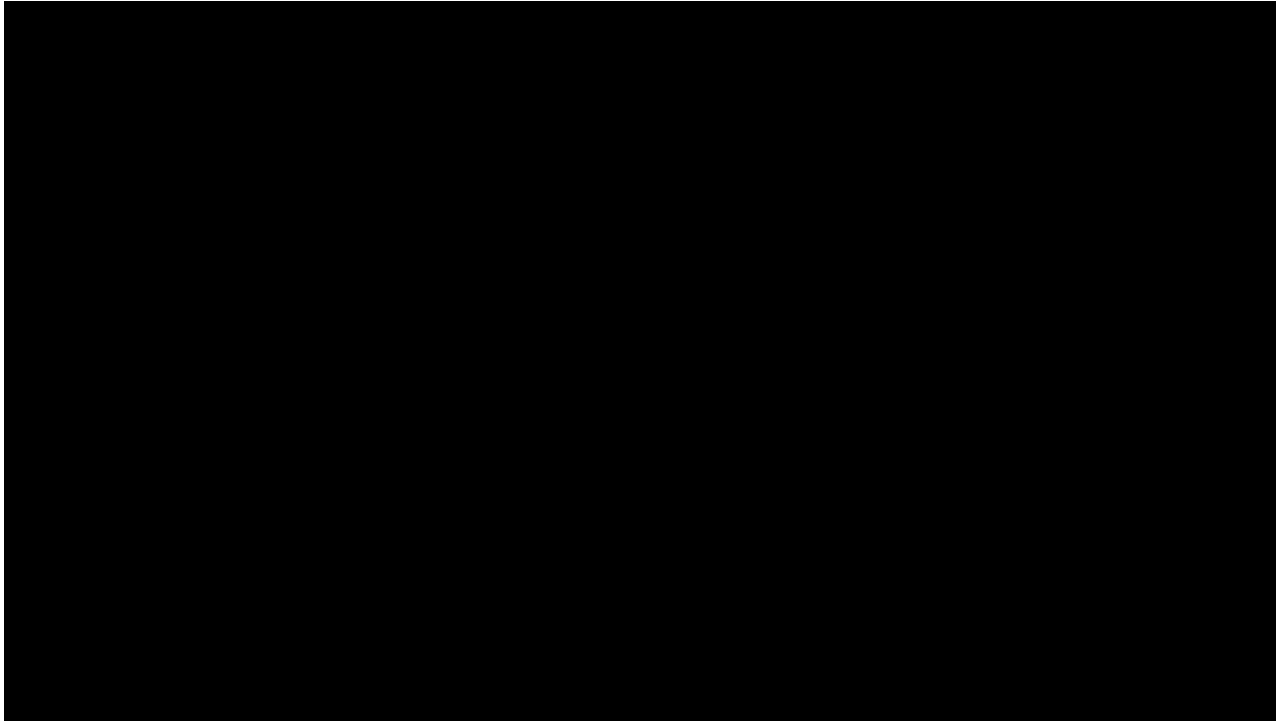
☉ <i>Gold.</i>	A. F. <i>Aqua Fortis.</i>
☽ <i>Silver.</i>	A. R. <i>Aqua Regis.</i>
♁ <i>Iron.</i>	S. V. <i>Spirit of Wine.</i>
☿ <i>Mercury.</i>	☊ <i>Sublimate,</i>
♃ <i>Jupiter.</i>	☋ <i>Precipitata.</i>
♀ <i>Venus.</i>	♁♁♁ <i>Amalgama.</i>
♄ <i>Lead.</i>	▽ <i>Water.</i>
♁ <i>Antimony.</i>	△ <i>Fira,</i>
♁ <i>Sal armoniac.</i>	

Excerpt from

"A Choice Collection of Rare Secrets"

by Kenelm Digby (1682)

Course videos are another area for infusions.



- Jules Verne
- Comet lander rocket
- 1930s cinema
- Paracelsus
- Les Paul guitars

Infusion can happen during facilitation of a course as well.

Re: Opinion: Cryptozoology is a pseudoscience. [Comment](#)



Emily Faulconer

10/20/2022

It was not too long ago that the eerie clouds in The [Scream](#) were attributed to an atmospheric phenomenon of polar stratospheric clouds that were likely present in the era the artist made the painting. You can read more here: <https://www.smithsonianmag.com/smart-news/scream-might-have-been-inspired-rare-kind-cloud-180963052/> (I've not seen this artwork in person - I kind of thought it might be bigger. Has anyone been to the Dali museum in Tampa?

Re: Deep Deep Geological Disposal [Comment](#)

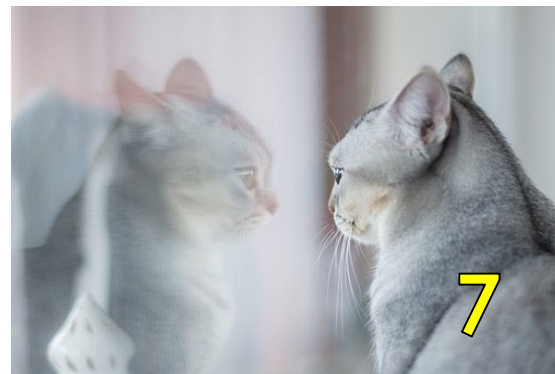
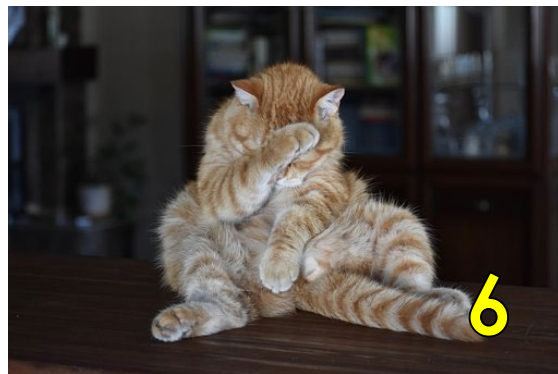


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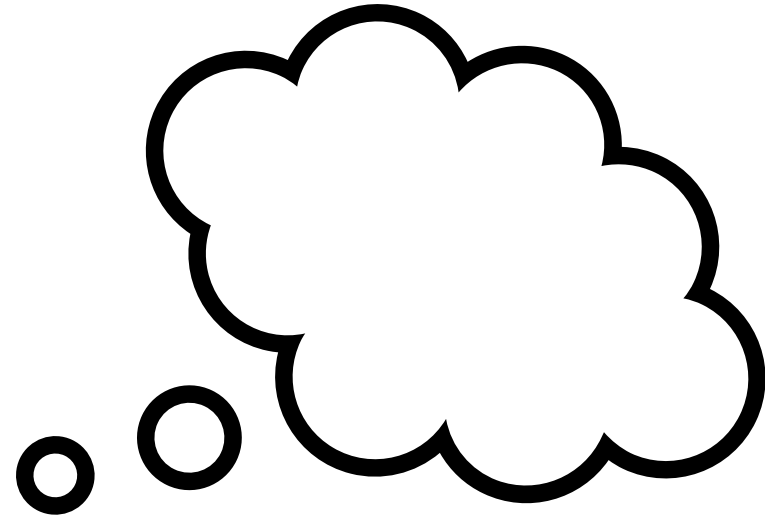
05/19/2022

The poem "[Beowulf](#)" was written in Old English in the 6th century CE. How much do you readily understand of that poem? <https://www.poetryfoundation.org/poems/43521/beowulf-old-english-version> Will future civilizations know what a specific symbol means? Even in our lifetime, hazard symbols have changed! The image below shows the changes to Canada's hazard communication from the 1988 version to a GHS-compliant version in 2015.

Self-Reflect: On the “cat” scale, what is the current level of H-STEM infusion in your classroom?



Brainstorm: What are other ideas for infusions?





Questions?

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Infusing Humanities in
STEM Education