

STEM Project - Based Learning

Why is STEM Education Important?

Balance Model of STEM

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HSCI2020 Conference

Viana do Castelo – Portugal

13-17 July 2020

.. based on Projects ?!

“

Projects we have completed demonstrate what we know - future projects decide what we will learn.

DR. MOHSIN TIWANA



STEM Project - Based Learning promotes students to work together



What is STEM?

What is STEM?

S

Science

T

Technology

E

Engineering

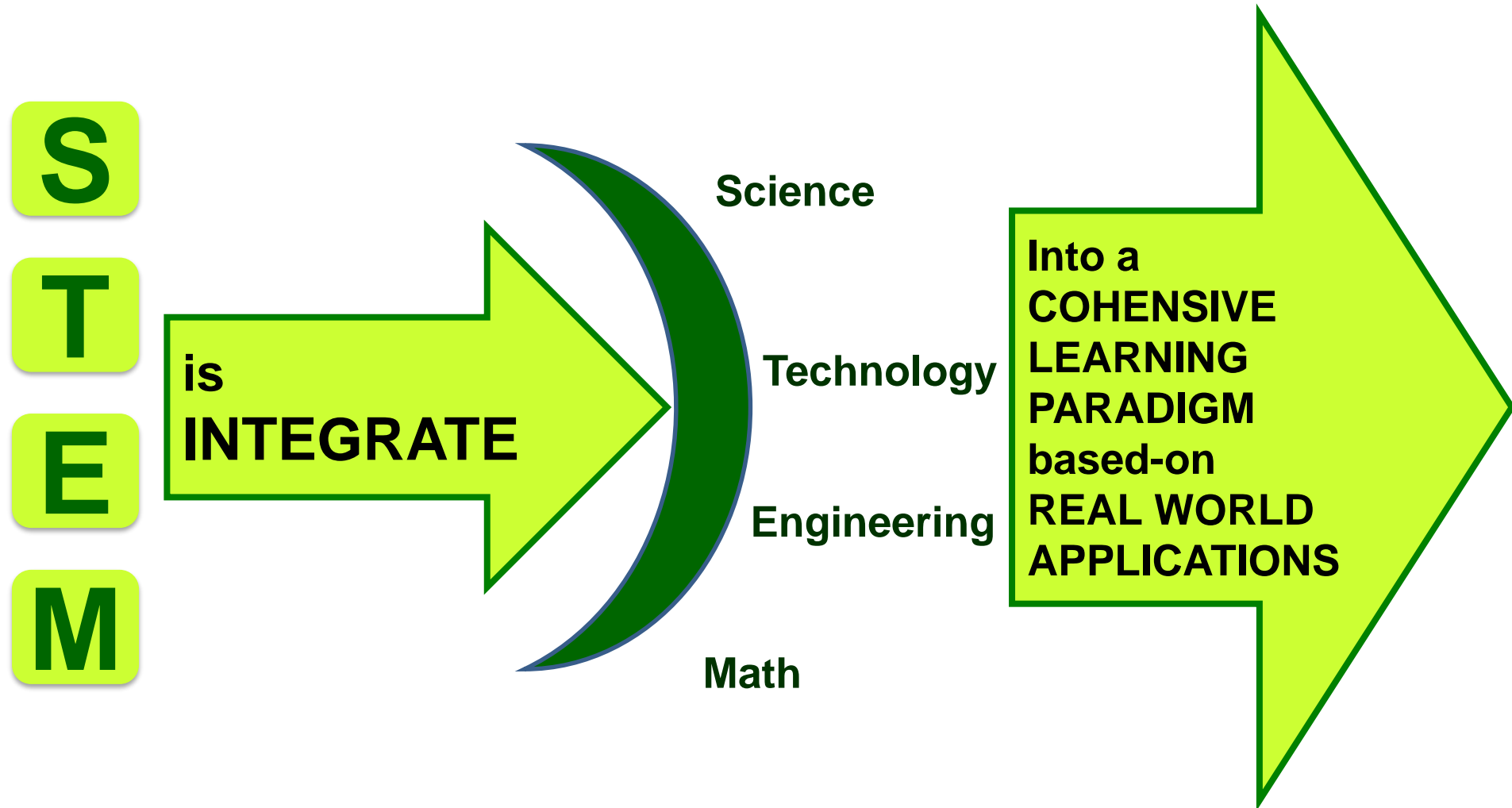
M

Math



in an
INTEGRATED
manner

What is STEM?

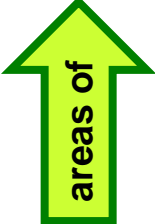


Science

Engineering

Technology

Math



INTEGRATES



an approach to learning and development



STEM?

STEM promotes **BRIDGE** the **GAP** between **BUSINESS** and **EDUCATIONAL GOALS** to create a more **PRODUCTIVE** and **SUSTAINABLE GLOBAL CULTURE** based-on **TEAMWORK**.



Conventional Educational System



SEPARATE
subjects

Is Physics so boring?

D = Dislike



D = Dull



D = Difficult



3D's

STEM teachers must be distinguished !!



STEM teacher enjoys Hands-On Science as a student !!



USA vs. Singapore in International Assessment of **science** !



USA vs. Singapore in International Assessment of **Math** !

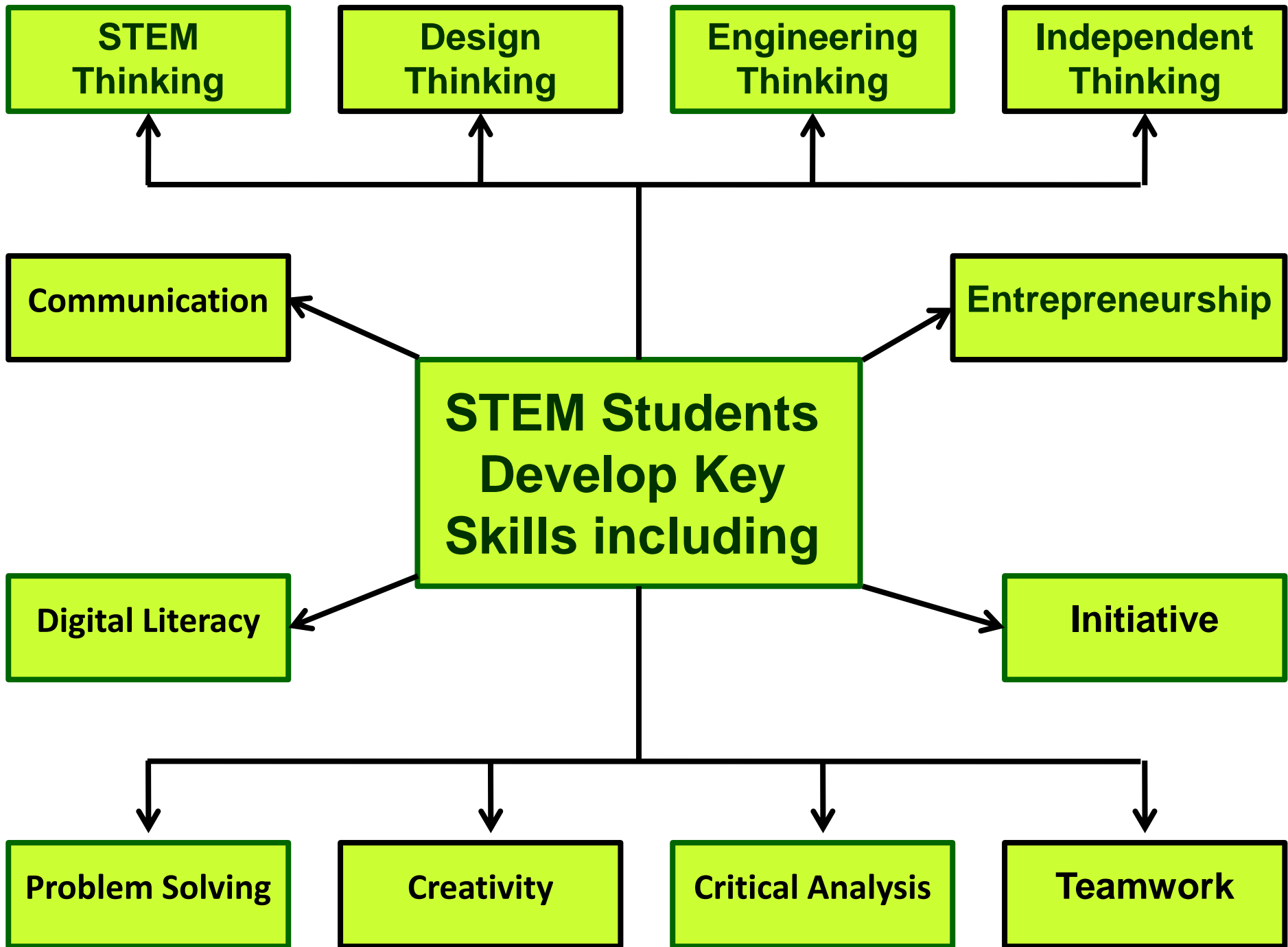


21st Century Skills



“I am calling on our nation’s governors and state education chiefs to develop standards and assessments that don’t simply measure whether students can fill in a bubble on a test, but whether they possess 21st century skills like problem-solving and critical thinking and entrepreneurship and creativity”

-President Barack Obama, March 2009



So, What is STEM for?

STEM


IS NOT

A NEW
SUBJECT

What is the Difference between Science and Engineering?

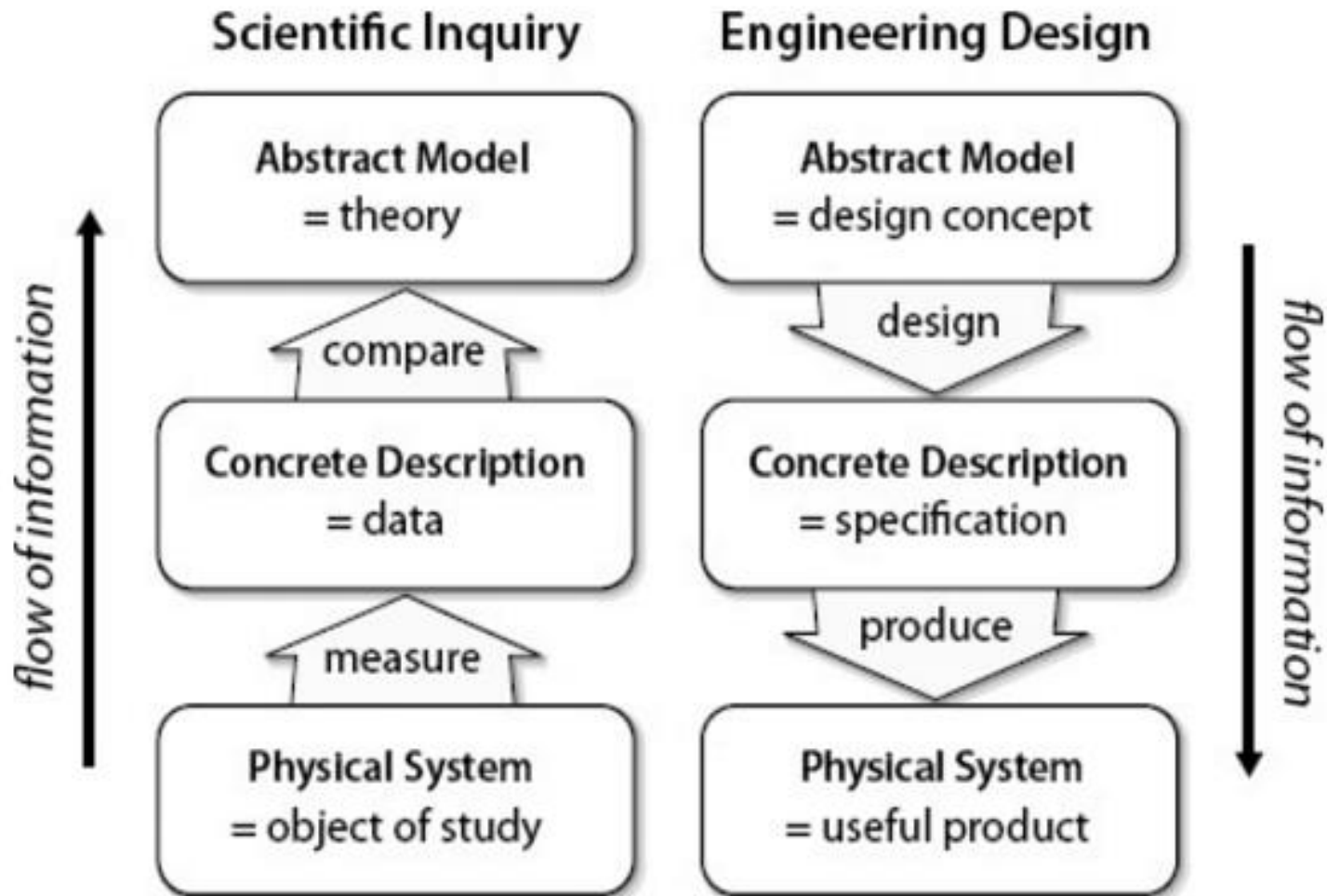
SCIENCE: UNDERSTANDING

ENGINEERING: CHANGING



**WORLD
around you**

Anti-Parallel Structure of Scientific Inquiry and Engineering Design



Schools Go STEM

They are **PRACTICING**



They are **STEM THINKING**

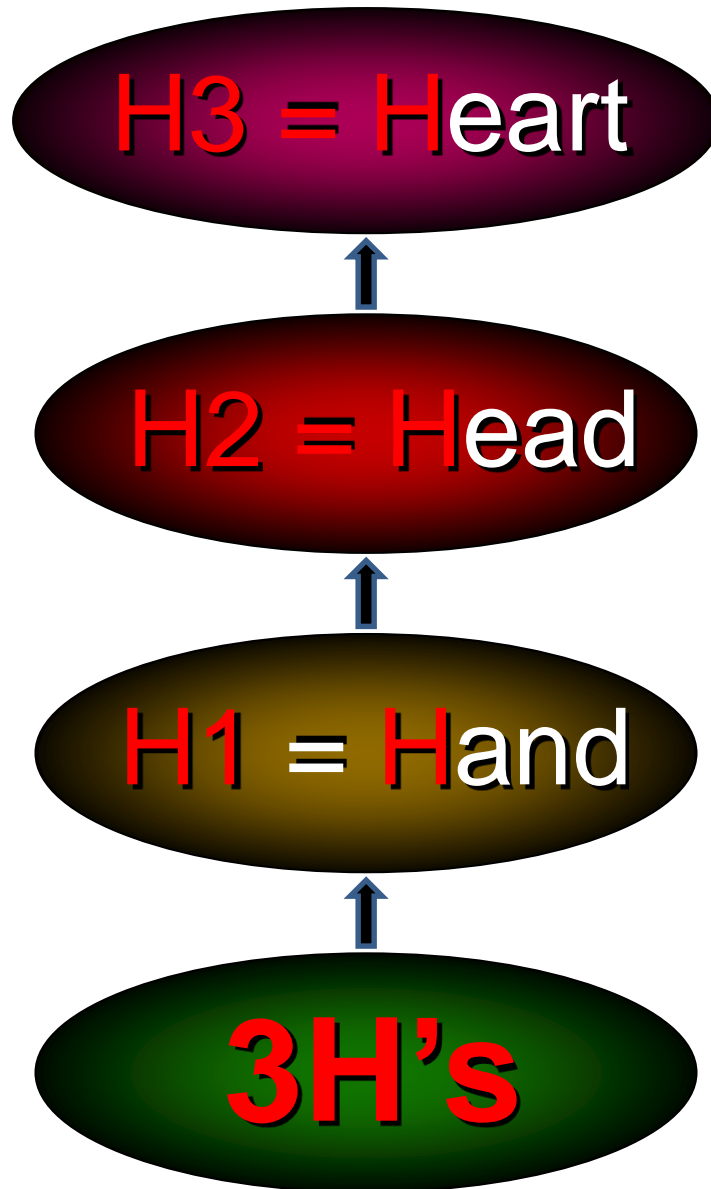
STEM AWARENESS

Why is STEM Education Important?

Why STEM?

- Fosters ingenuity and creativity.
- Builds resilience.
- Encourages experimentation.
- Encourages teamwork.
- Encourages knowledge application.
- Encourages tech use.
- Encourages adaption.

3 H's of STEM Education



Rationale of STEM

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

Universe.

- John Muir

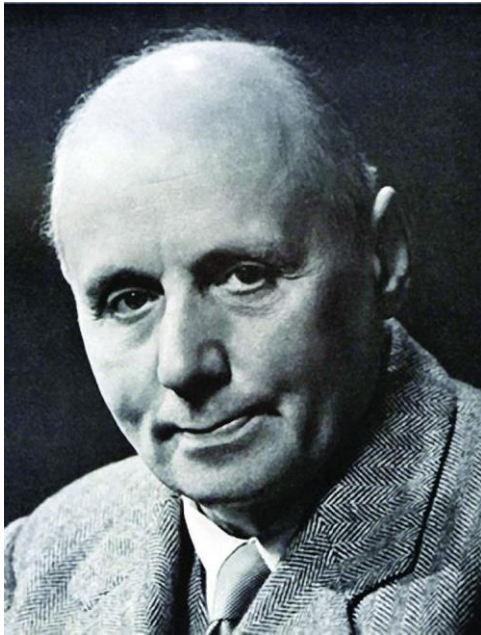


STEM Project - Based learning

How can STEM teachers lead students ?



Wisdom



“There are **three ways** of trying to win the young ...”

~ **Kurt Huhn**

Keep in mind ..

We have to reframe •
the abilities of our
children. We have
deep natural talents,
but we have to
discover them and
cultivate them.“

Sir Ken Robinson •



What are STEM Skills?

STEM problems require you to •
quickly work to make sense of
problems as they are presented,
and work productively to propose •
real and appropriate solutions

To think *out-of-the box* !

Requires the ability to look at and propose solutions to a problem through multiple approaches, including ones that are highly creative or “out-of-the box.” •

In STEM, mistakes and failed attempts are positive experiences, offering opportunities for deeper learning •

Hands-On !

STEM requires hands-on, active participation to effectively solve problems. Students are the drivers of solutions and should be asking the questions, proposing the ideas, generating and testing solutions, and making decisions based on data to understand how to refine ideas further.



Problem Solving !

The mathematics and science skills you are • learning in school are the foundation of STEM and must be applied in pursuit of solutions. The math and science used to solve problems will connect to and extend your coursework, as well as highlight connections between ideas and subject areas.

To be alert !



Problem Solving 4 Types of Problems

Known,
solution
requires
just
action



Known,
solution
requires
additional
expertise



Known,
solution
requires
creative
approaches



Unknown,
need to
be
identified



Critical Thinker ..

Effective STEM learning requires you •
to analyze information, evaluate
designs, reflect on your thinking,
synthesize new ideas, and propose
creative solutions. All of these skills
are vital to becoming an
independent, *critical thinker*.

Argument ..

Arguing is not always bad.

STEM students use evidence-based.

Using reasoning, analytical and critical thinking.



Social Responsibility..

To be Social •
Responsibility, you
have to apply **CARE-**
Demands for a good
Global Citizenship.

C = Connect. •

A = Accept. •

R = Respect. •

E = Empower •

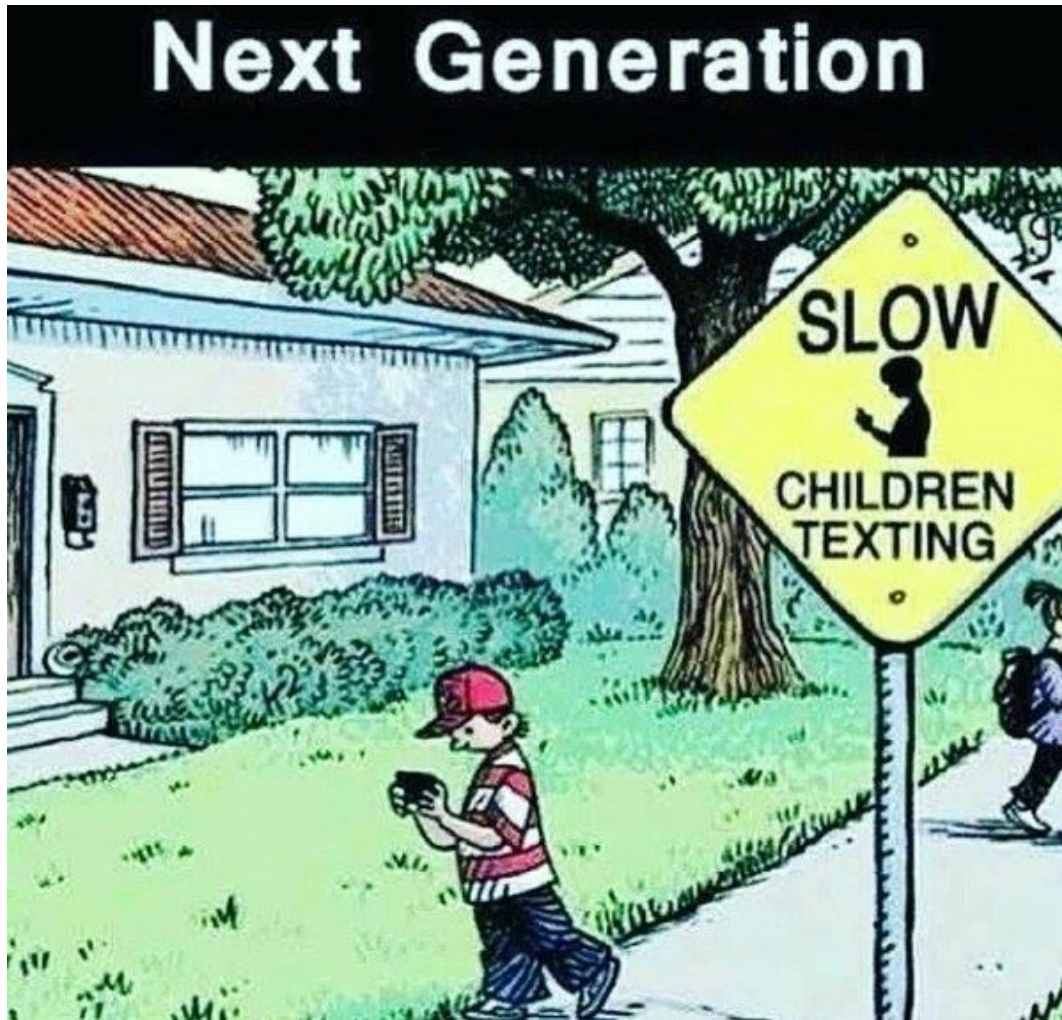


part of a **Collaborative team.**

Big challenges are • rarely solved by individuals. Working on STEM problems also involves learning to work as a productive part of a ***collaborative team.***



Next ..



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Now ..



Thanks a lot ..

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