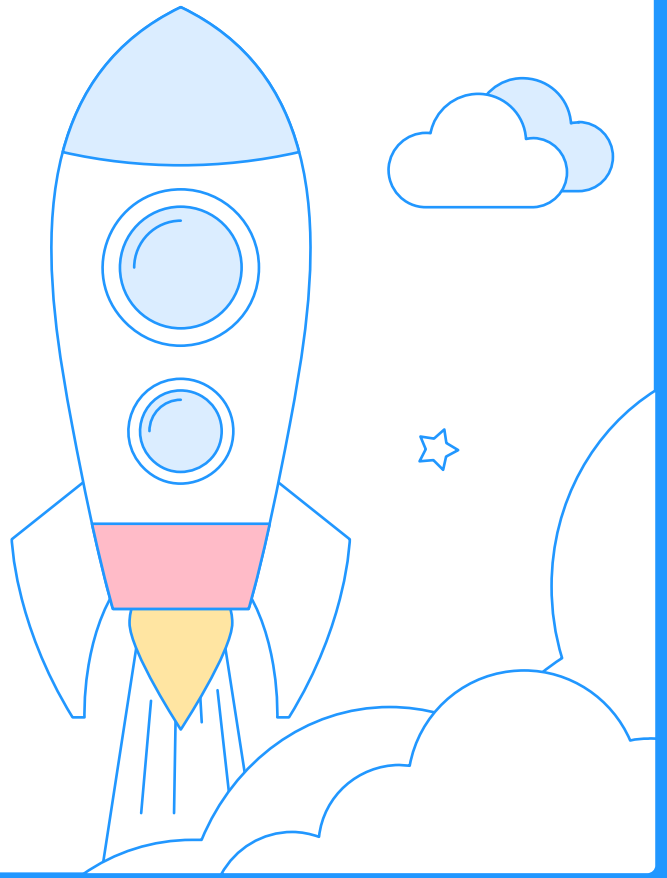
Integration of STEM Practices



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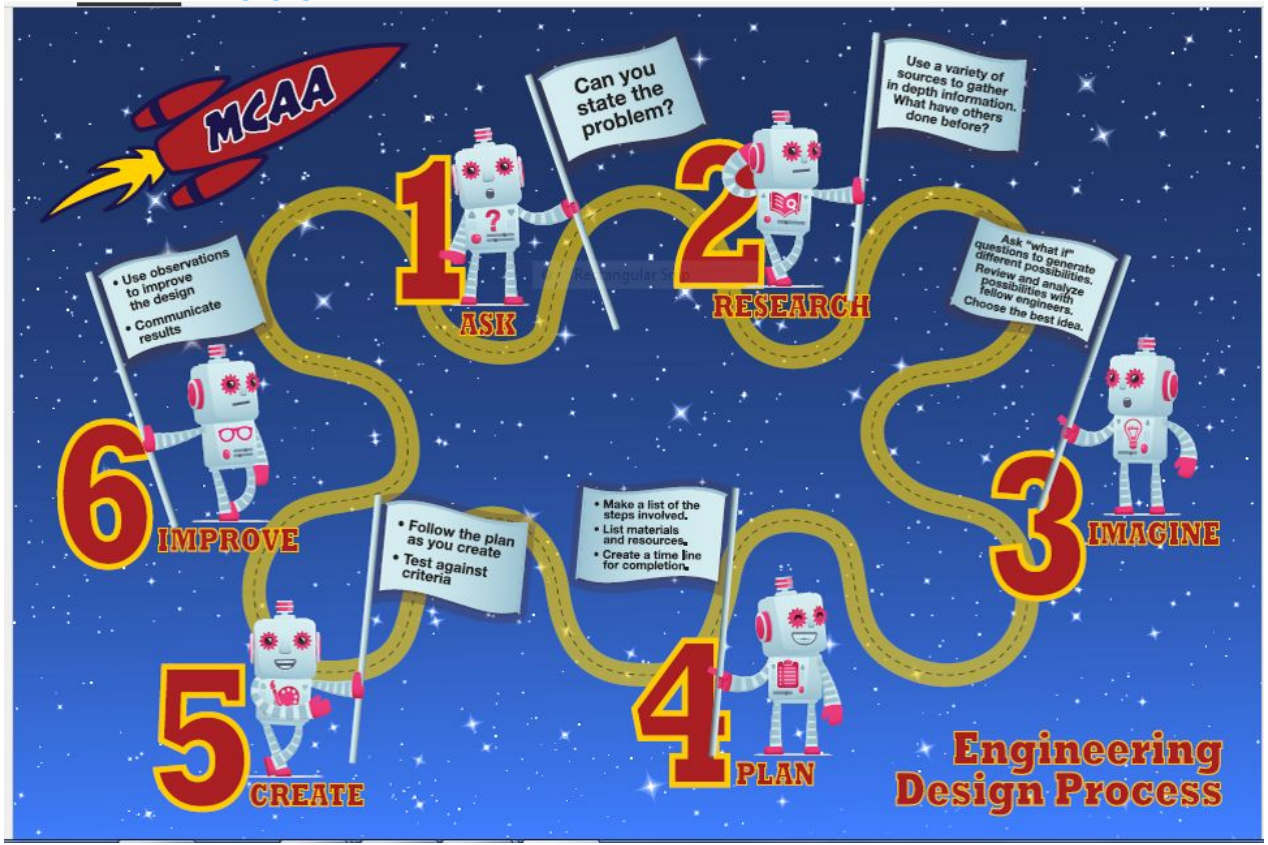
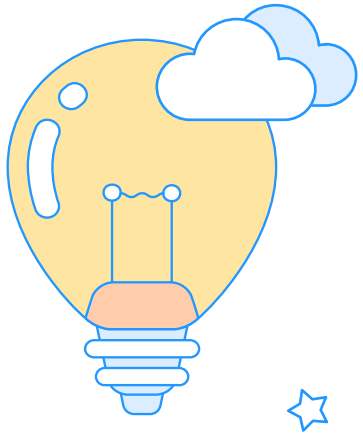
The engineering design process is everywhere.





Math Word Problem Process

ASK
Understand the problem. What do you know? What are the facts from the problem?

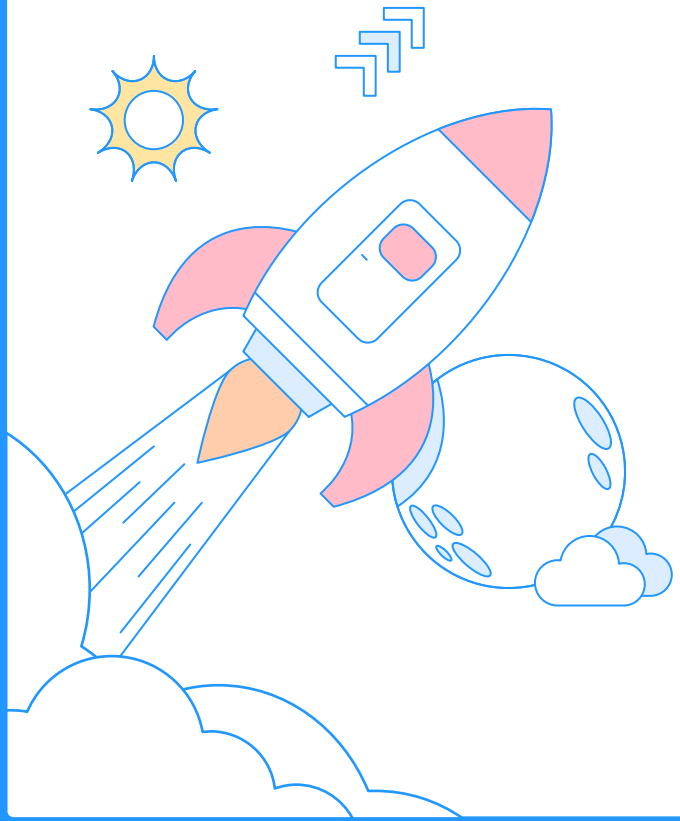
RESEARCH
What do you need to find out?

IMAGINE
Draw a picture or diagram.

PLAN
What are the steps needed to solve? What operations do you need to use?.

CREATE
Show your work to solve the problem.

IMPROVE
Use estimation to check if your answer is reasonable or use another strategy to check your work. Write your answer in a complete sentence.




Understand the Assignment
Gather Ideas and form a Working Thesis/ Outline
Write a Draft
Revision
Proof-Read/ Edit Final Draft
Receive Feedback/ Revise if Needed
The Writing Process


Ask
Understand the prompt
Research
Take notes on paired passages.
Imagine
Decide on a thesis.
Plan
Create a plan based on research and thesis.
Create
Write your draft.
Improve
Revise, edit, and peer review.
The Writing Process

Novel Engineering– integrate literacy with STEAM

- ★ Inspired by kids and grounded in research
- ★ innovative approach to integrate engineering and literacy in elementary and middle school
- ★ Uses **existing** classroom literature – stories, novels, and expository texts – as the basis for engineering design challenges that help them identify problems, design realistic solutions
- ★ Engage in the Engineering Design Process while reinforcing their literacy skills.

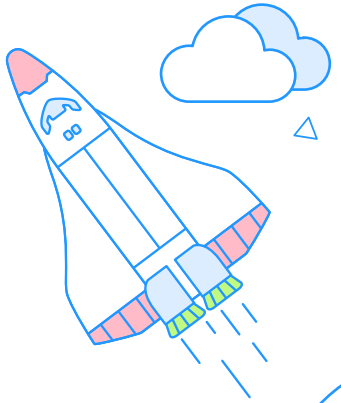
Launch your unit right

Look at this picture for 30 seconds. Write down what you notice, what you can infer, and any questions you have.

Social Studies Integration

Research

Think beyond reading passages



1

Vocabulary Integration

Key words from research

2

Math Integration

What skills can students use to learn more about the topic?

3

Reading Integration

Nonfiction main idea and supporting details, text features, etc.

4

Science Integration

Can hands-on science labs supplement your research?

5

Writing Integration

Gather research notes from a variety of nonfiction sources

6

Social Studies Integration

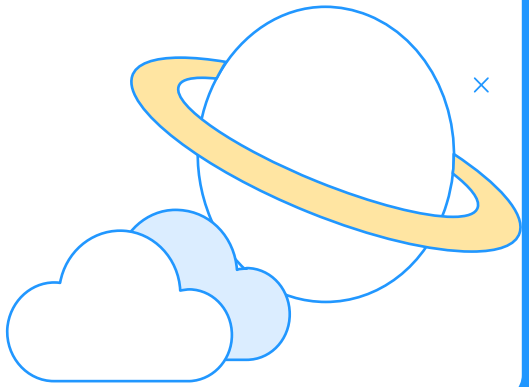
Primary Source Analysis template, map skills

Imagine

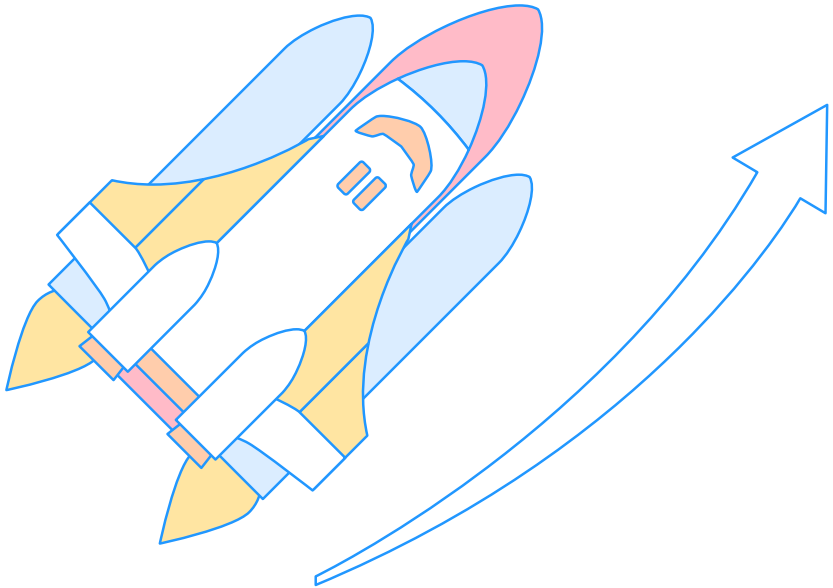
Brainstorm “what if” possibilities for the final product and choose the best idea.

Writing Integration: Sentence stems to explain their ideas

The idea we chose is _____ . We think it is the best option because _____.



Plan



Writing integration: make a list of procedural steps (check for clarity to make sure others could follow it!)

Product

Language Integration: must use vocab words in description of the final product, and speaking skills when presenting

Essay

Writing Integration: Write an informational essay whose prompt is based on the research from the second phase of the engineering design process.

Improve

ELA Integration

Read other students' products and provide feedback.

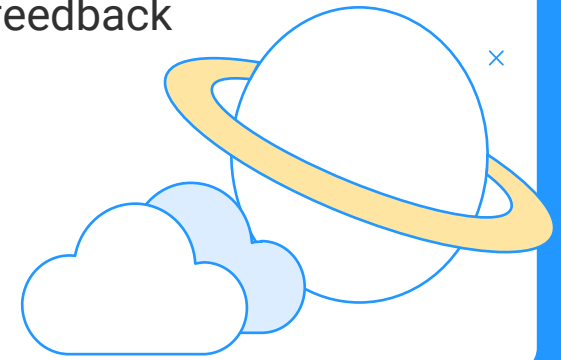
Writing Integration

Fill in sentence stems to provide meaningful feedback.

I loved _____, and I'm wondering if next time you coud _____.

Vocabulary Integration

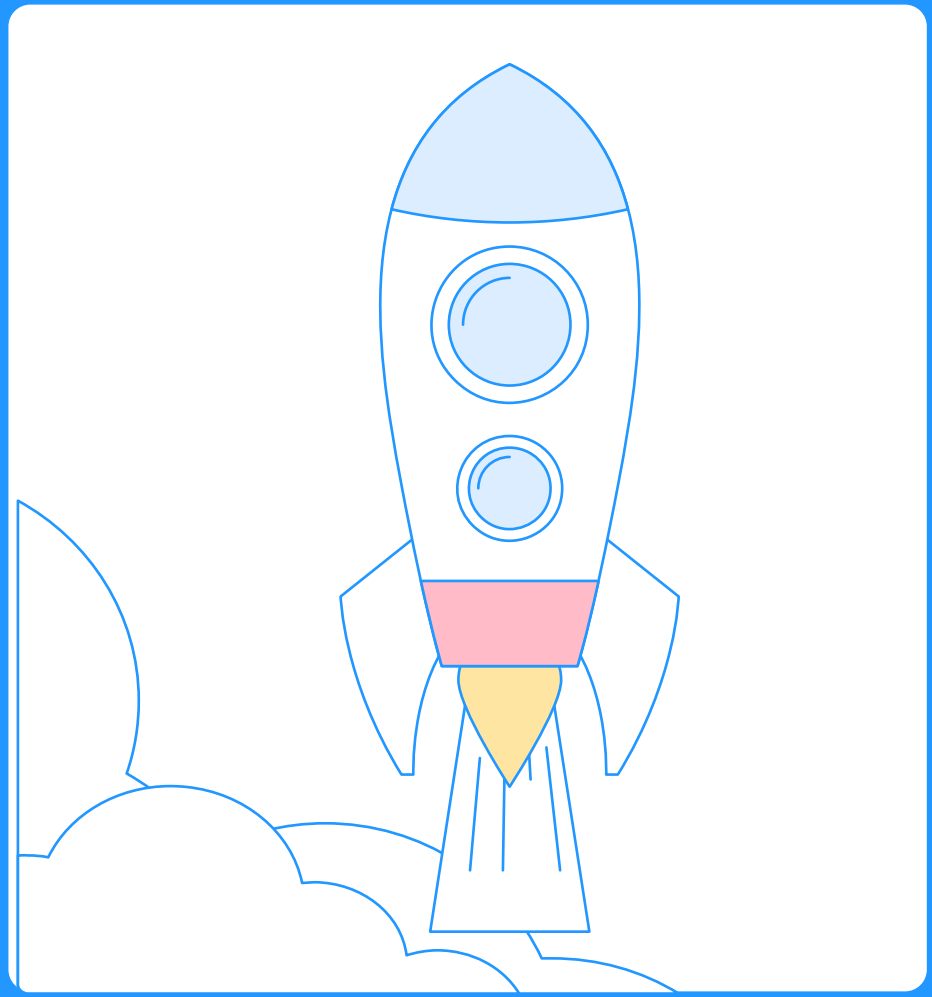
Require students to incorporate the vocabulary words into their feedback



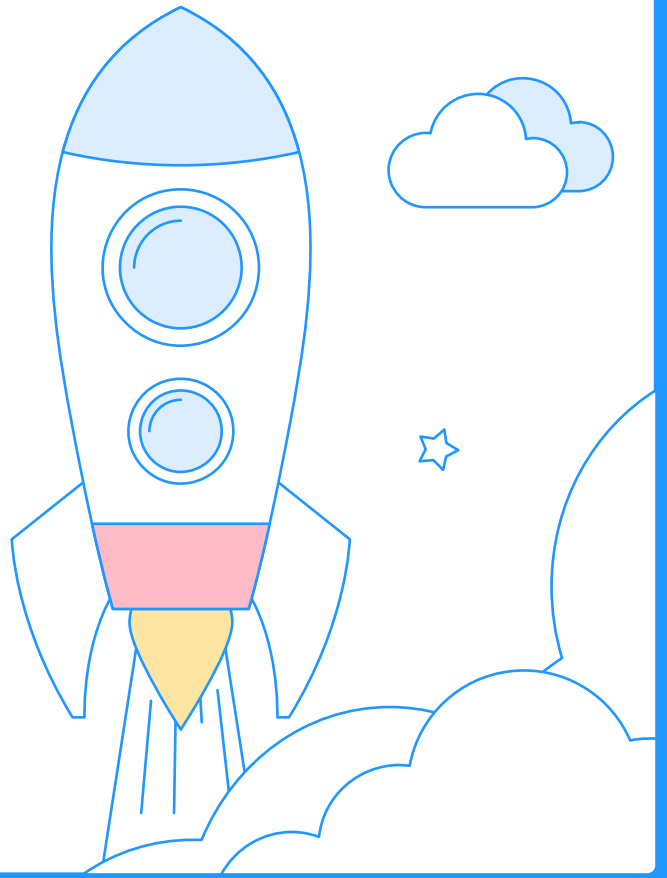
Integration Practices of STEM

There are numerous ways to get the biggest bang for your buck when implementing STEM.

By planning ahead, you can use your time efficiently to practice numerous skills across the curriculum during a STEM unit.



Mindset Matters



Kilpatrick–Mindset Matters

1. Mindset Matters
2. Yes and…
3. Fun Theory

What characteristics, mindsets, and perspectives do you think make a quality STEAM teacher/innovator?

Scan to participate :)

What characteristics, mindsets, and perspectives do you think make a quality STEAM teacher/innovator?

Results

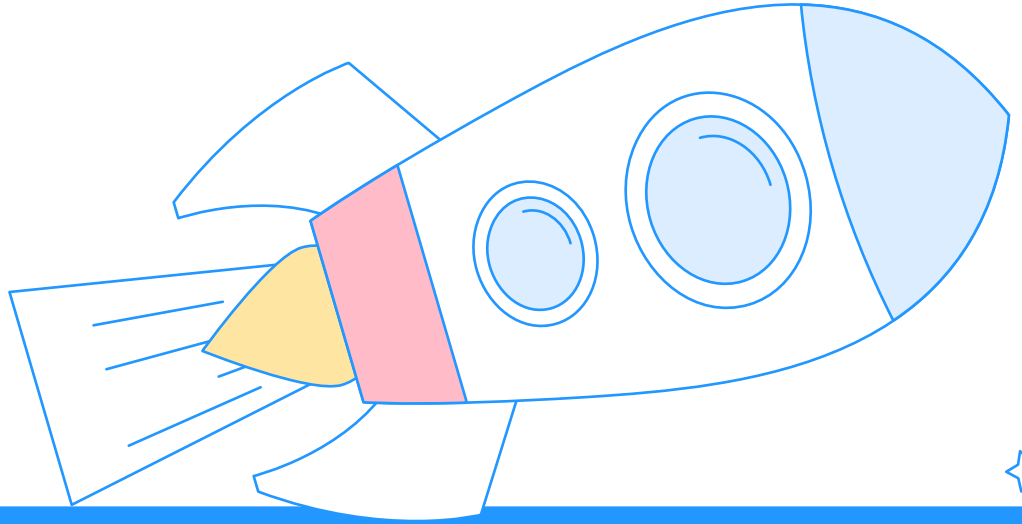
STEM Mindset

Per the NSTA:

Someone with a positive STEM mindset necessarily possesses a *growth mindset*—the idea your intelligence isn't fixed and you can get smarter by putting in effort. Those with a growth mindset possess grit, perseverance, and embrace learning from failure—no doubt a beneficial outlook for STEM students and practitioners as they question and investigate to understand phenomena, or design and evaluate solutions to new problems.

Habits of Mind

Habits of mind—a "set of problem solving, life related skills, necessary to effectively operate in society and promote strategic reasoning, insightfulness, perseverance, creativity and craftsmanship"



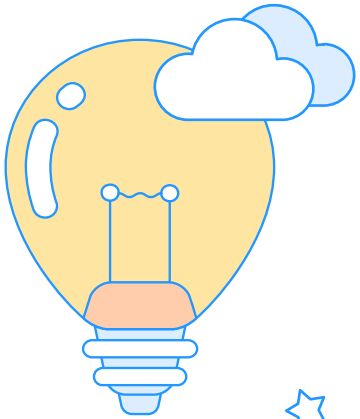
STEAM and Innovative Learning

Process

over

Product

Yes and...



FUN THEORY

Videos of the fun theory in action

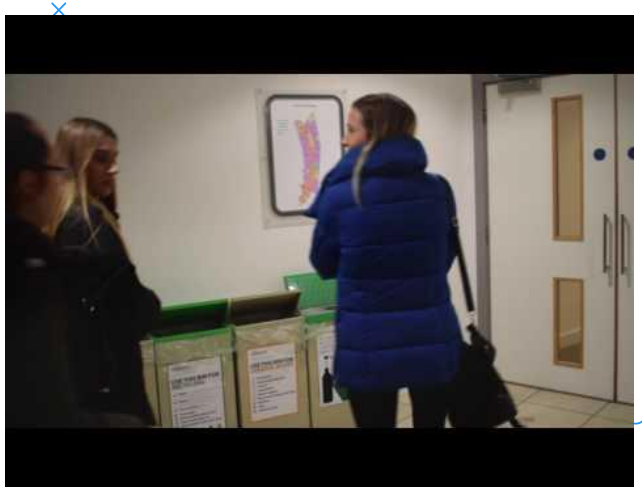
https://www.youtube.com/watch?v=SByymar3bds

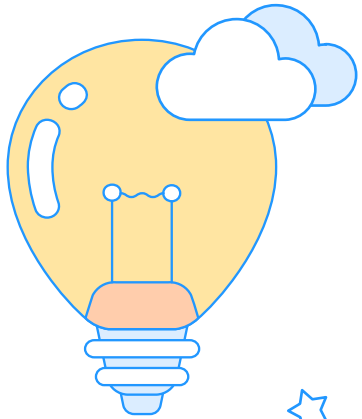
https://www.youtube.com/watch?v=KcaKocRXCB4

https://www.youtube.com/watch?v=CWwee62DW3U

https://www.youtube.com/watch?v=bHLgSfxz6bQ

https://www.youtube.com/watch?v=-ydb0qCucqk





Conclusion

Rockets
Microbes
And Electricity, Oh My!

As we move to our STE(A)M sessions we will pass through our 5th Grade hallway—past the gardens—and into our Lab Buildings for rotations.