# STEM Guidebook

YMCA CHILD CARE PROGRAMS

STEM is a curriculum based on the idea of educating students in four specific disciplines — science, technology, engineering and mathematics — in an interdisciplinary and applied approach. Rather than teach the four disciplines as separate and discrete subjects, STEM integrates them into a cohesive learning paradigm based on real-world applications.
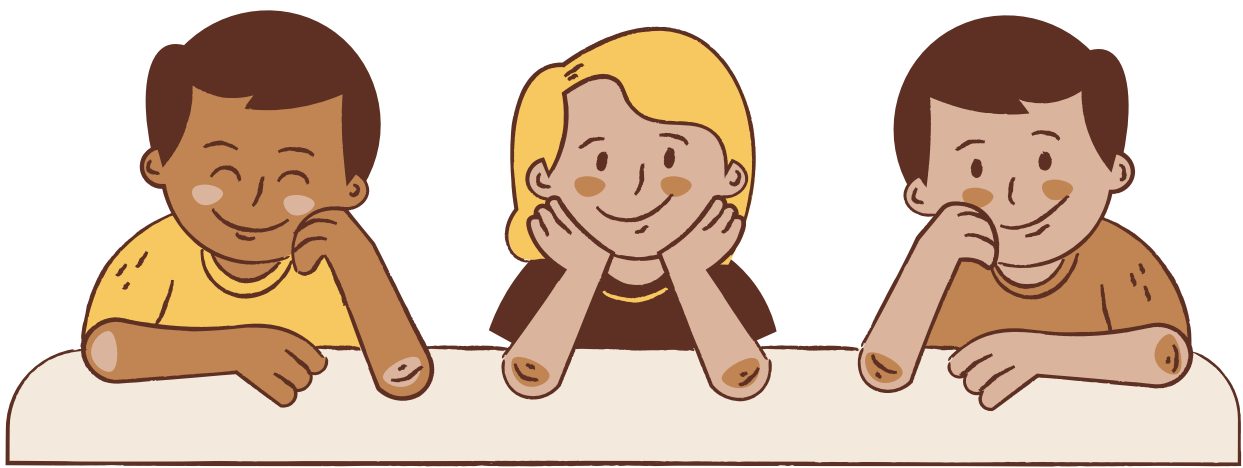
STEM at the elementary level focus on the introductory level of STEM, as well as awareness of the STEM fields and occupations. This initial step provides standards-based structured inquiry-based and real world problem-based learning, connecting all four of the STEM subjects. The goal is to pique students' interest into them wanting to pursue the courses, not because they have to. There is also an emphasis placed on bridging in-school and out-of-school STEM learning opportunities.

what is STEM?

What is STEM?

S	T	E	M
SCIENCE	TECHNOLOGY	ENGINEERING	MATH
Observing, experimenting, making predictions, asking questions	Being inventive, using tools, making things work, identifying issues, using computers	Solving problems, using materials, designing and creating, building	Patterning, sequencing, exploring shapes, numbers, volume and size

why STEM?

The YMCA's Youth Development Department seeks to bridge achievement gaps and help youth (K-5) be grade level ready.   The Idea behind STEM is to prepare students for successful careers in the 21st century. The youth program at the YMCA reaches a wide range of students. Integrating STEM curriculum into our programs can provide more exposure and resource to youth that may not normally have the opportunity to do so.
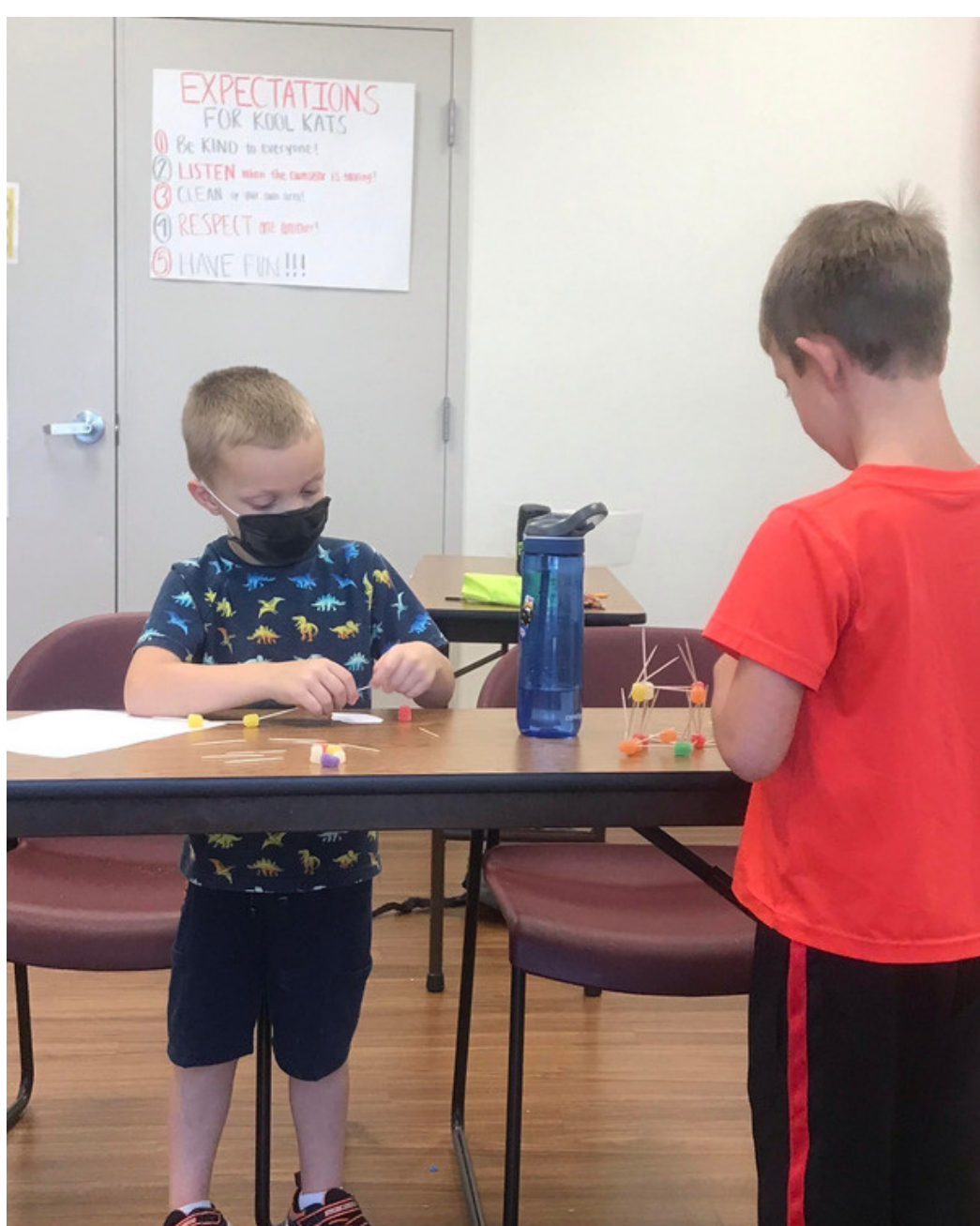
- Gives youth the freedom to explore
- Creates low-pressure environment and informal settings which empowers youth
- Generates interest and gets all youth involved
- Cultivates broadly applicable skills

STEM Process

ask
DEFINE THE PROBLEM

You can't find a solution until you have a clear idea of what the problem is. Identfying the problem includes discerning what is needed as well as any constraints or rules that must be followed.

Imagine
BRAINSTROM THE SOLUTION

Next, you work to imagine the possibilities that address the specific needs you have defined. This part of the of the phase is about volume of ideas, not quality.
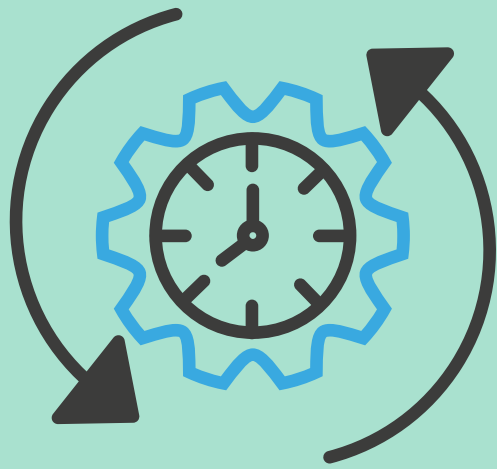
Plan

It is important that studens are able to devise a plan on their own. It is ok to offer assistance, but we want most of the plan to come from our students.

Experiment

TEST IT OUT

This step is for students to test out their plan and see if their theory works.
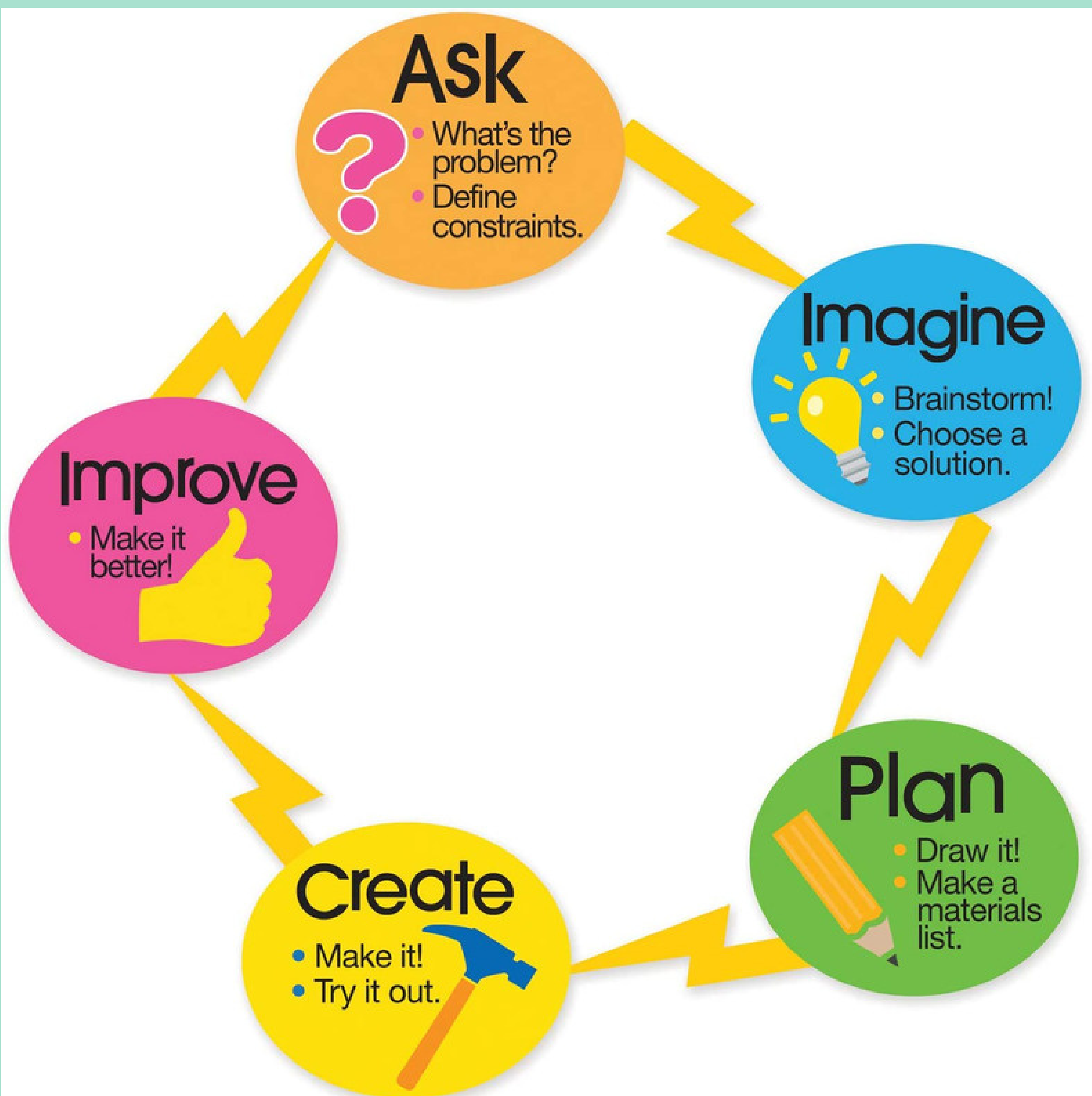
Improve

MAKE IT BETTER

What works? What doesn't? What could work better? Modify your desgin to make it better.

Redesgin and build may repeat for a little while.

Reminders

- STEM is meant to be challenging
  - Give students positive affirmations

- Do not give up on activity!

- Stay positive!

- Encourage all students to participate
  - Give them choice if they do not do this activity they will need to sit out from something they want to do later.

- Follow the directions in the lesson plan

- Work with the students

- Be mindful when creating groups

- Watch for a student that is taking over the whole project

- Be patient
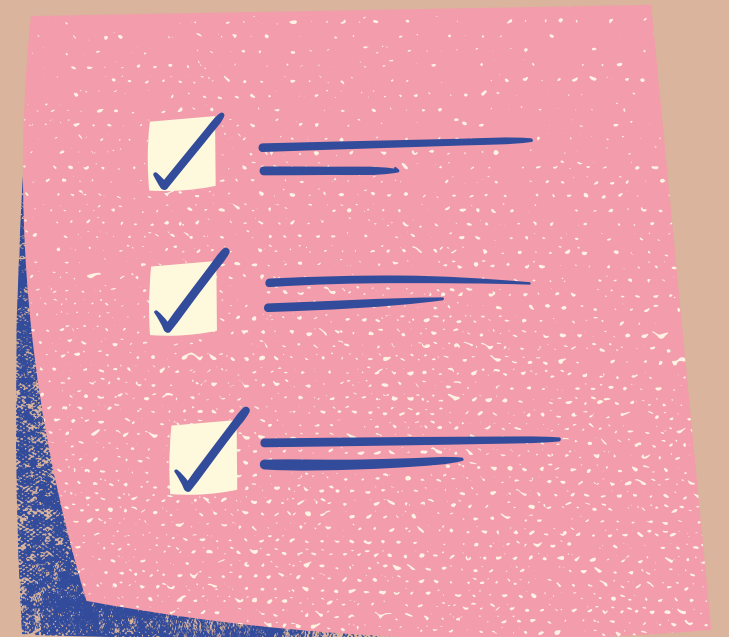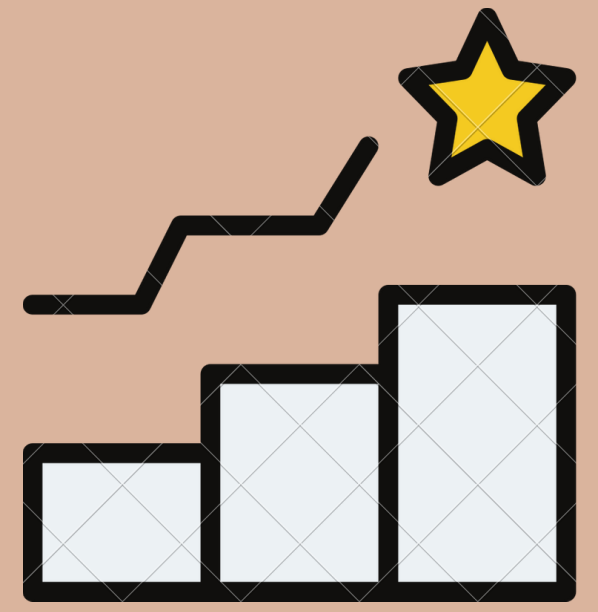
STEM Questioning!

1) What is the problem you are trying to solve?

2) What materials will you use to solve the problem

3) What is the goal?

4) What are possible soultions to the problem?

5) Is this problem similar to another problem you have solved?

6) How can you combine the desgins of your group members to create the best solution?

7) Who in your group is doing which roles?

8) How will you test the desgin?

9) Does your desgin meet all the requirements?

10) What worked? What did not?

11) What changes can you make to your desgin?

12) What suprised you about the challenge?

13) What was frustrating?