FULL STEAM AHEAD

presented by LAEF
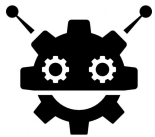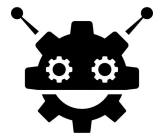#### LOS ALAMITOS EDUCATION FOUNDATION

STEAM Fair

2017

Robotics

Student Name(s): _____

Robotics

The STEAM Fair gives students a chance to engage in a STEAM-based project of their interest.

If you are completing a robotics project, you will be required to follow the Engineering Design Process (shown below). All parts of this process should be documented and included as part of your project presentation.

The date of the STEAM Fair is <u>Thursday, April 13th in the Media Center.</u> Your presentation and materials should be delivered to the Media Center before school. On <u>Thursday, April 13th from 12:10-2:20, you will be presenting your project to students from McGaugh.</u>

A detailed description of further expectations are outlined on the following pages.
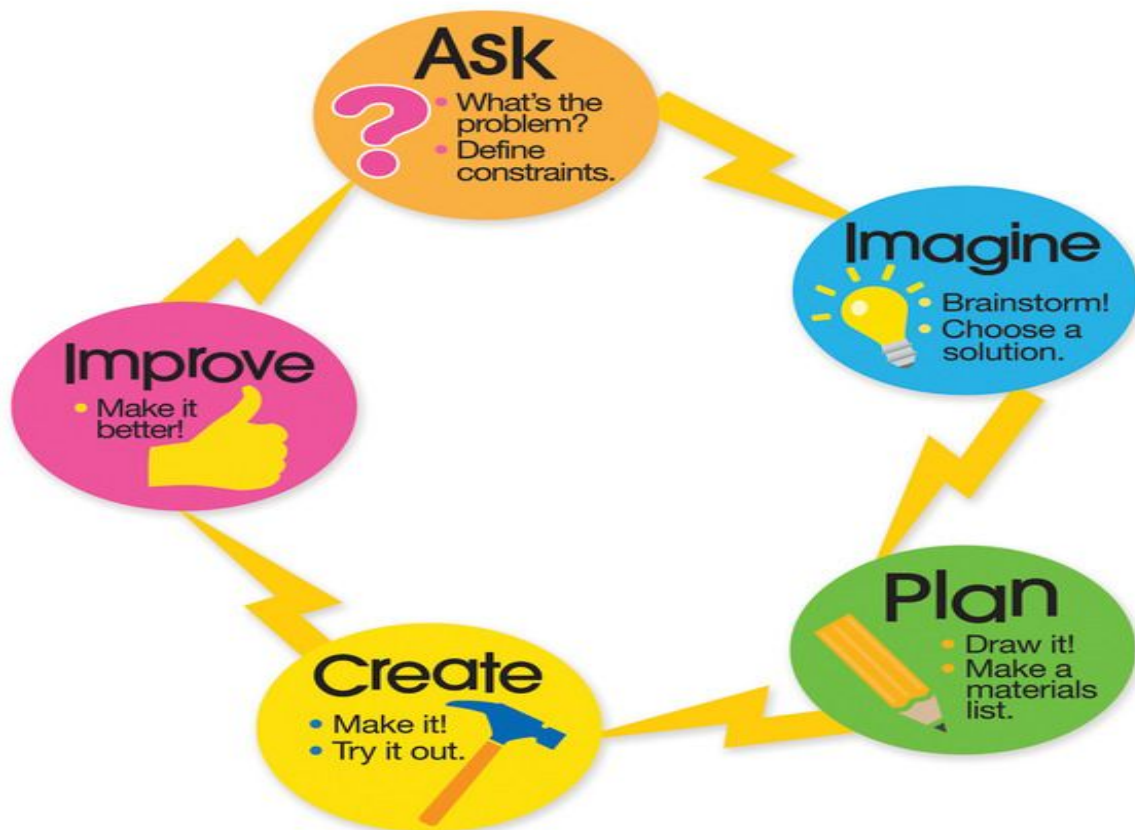
Step 1: ASK - Define the Problem

- What is the purpose of your robot?
- What kind(s) of problem(s) could your robot solve?
- What are the constraints (limits due to available resources and environment) for your robot?
  - Examples of "constraints":
    - must be at least 2 feet tall
    - must be able to lift 10 lbs
    - must be able to turn 360 degrees
    - must be able to follow a drawn line
- Journal or draw some of your ideas.

Step 2: ASK - Research

- Research topics:
  - What other designs are comparable to your function/task? Identify at least 3 other designs currently available on the market. (If applicable)
  - What parts would you need for this type of robot?
  - What software (if any) will you need to make your robot work?

Step 3: IMAGINE - Brainstorm

- In your own words, write a short paragraph describing your problem and constraints (should have been defined in Step 1).
- Draw brief designs (brainstorm!) to explore possible solutions.

Step 4: PLAN - Develop an Initial Design Proposal

- Develop a sketch of your design. This sketch should be NEAT, CLEAR, DETAILED, and LABELED.
- With your sketch, do the following:
  - Label each part identifying:
    - Material it is made of (if applicable)
    - Purpose (if applicable)
    - Dimensions (length, width, height, etc.)
  - Include top view and side view (if helpful)

Step 5: CREATE - Build, test, and re-test

- Build your design!
  - YOU ARE REQUIRED TO TAKE PICTURES DURING YOUR BUILDING AND TESTING PROCESS!
    - These pictures should be included as part of your presentation at the STEM Expo.
    - Put your photos in chronological order, and write a brief description with each photo, detailing what is happening in the photo. This should be included as part of your presentation at the STEAM Fair!

Step 6: IMPROVE - Communicate Design Changes

- As you build each section of your design, create a 3-column data table (see sample below) describing changes made and why the change was made (how the change affected your device).
  - MAKE SURE YOU DO THIS AS YOU BUILD SO YOU DON'T FORGET ALL THE MINOR CHANGES!
  - Any change made to your initial design proposal should be recorded.
  - You may have to test/change one part multiple times before it works - remember to record <u>all</u> of these!
  - Pictures of these changes should be taken and added to the pictures in the CREATE section.

Sample 3-Column Data Table:

	Change Made	Why Change was Made	How Change Affected Device
Change 1			
Change 2			

Step 7: IMPROVE - Develop a Final Design Proposal

- Provide a final sketch of your device. This final sketch should follow the same criteria as the sketch in your initial design proposal, but it should include all the changes that were made.

Presentation

- **You will be required to present your project at the STEAM Fair.**
  - Be prepared to explain the process by which you came up with the final design.

- Your presentation should include a brief introduction and conclusion, and it should also follow the engineering design process.

STEAM Fair Expectations

<u>What should I bring to present at the STEAM Fair?</u>

- Visual Aid(s)
  - tri-fold or other large poster board ([Example])
    - board should:
      - include name of your project and your name
      - include any pictures/data tables/parts of your project that can be attached
      - stand on its own
      - be neat!
  - your actual robot (if possible)
  - all labeled pictures of robot creation process, in chronological order
- a computer or other technology device (if applicable)
    - if you programmed your robot, we would love to see the code!
      - a printed version of this is acceptable if technology is not available