

ENGINEERING DESIGN PROCESS

ASK:

- Provide or lead students to discover a task or challenge that needs to be solved.
- Students will need to engage in and develop an understanding of what the task/challenge is asking.
- Provide opportunities for students to do research to further their understanding and identify any constraints or limitations.

IMAGINE:

- There is more than one solution to the task/challenge. Provide students with an opportunity to brainstorm possible solutions.
- Encourage creativity and out of the box thinking.
- Remind students that failures lead to successes. Ideas will evolve over time and testing as they gather information and collaborate to make improvements and modifications

PLAN:

- Remind students that scientists and engineers take detailed notes (both linguistic and non-linguistic) of their thinking so it can be replicated by others.
- Students will need to list materials that will be used (type, quantity) in their prototype.
- With technical drawings encourage students to provide labels and identify components and purpose.

EXPLAIN:

- Students need to be lead in explaining the "Why" behind their prototype design (some examples):
 - Why were certain tools/materials chosen?
 - Why is it constructed this way?
 - How does this plan represent a solution to the design task/challenge?

CREATE:

- Students need to be provided with materials to develop their prototype based on their plan.
- Facilitate groups in following their plan to create their prototype, if changes are made during development, make sure they are recorded and rationalized.

TEST and EVALUATE:

- Students are engaged in testing their prototypes and making observations.
- If students discover a solution, lead them to the "ASK" and have them identify and rationalize how it meets the need of the challenge task.

IMPROVE:

- Observations collected when testing will be used to generate ideas for improvements.
- Students should be able to provide a rationale for the change (ie.. Based on our observation of we need to because we think.....)
- Improvements/Modifications should be recorded (*Students could use a different color each time to record improvements)



