

# Something to Think About...

“Children need to explore and to discover. This is how you innovate; you fail your way to your answer. Scientists fail all the time; we just brand it differently. We call it data.”

-Anissa Ramierez

# Questions are the ENGINE that drive Science and Engineering

## **Science asks:**

- What exists and what happens?
- Why does it happen?
- How does one know?

## **Engineering asks:**

- What can be done to address a particular human need or want?
- How can the need be better specified?
- What tools or technologies are available or could be developed for addressing this need?

## **BOTH Science and Engineering Ask**

- How does one communicate about phenomena, evidence, explanations, and design solutions?

# Differences between Engineering and Science

## Measuring Success

### Science:

The goal of science is to develop theoretical descriptions of the world that can provide explanations over a wide range of phenomena, regardless if it has an immediate or practical application

### Engineering:

Success is measured by the extent to which a human need or want has been addressed

## Argumentation

### Science:

Goal of argumentation to find a single coherent and comprehensive theory for a range of related phenomena.

### Engineering:

Goal of argumentation is to evaluate prospective designs and then produce the most effective design for meeting specifications and constraints. There is never just one correct solution to a design challenge and as new technologies arrive this will enable new solutions.

# Engineering Design Process

## IMAGINE

- What are some solutions? Brainstorm ideas.

## ASK

- What is the problem? What have others done? What are the constraints?

## PLAN

- Draw a diagram. Make a list of materials you need.

## IMPROVE

- What works and what doesn't? Modify your design to make it better. Test it out.

## CREATE

- Follow your plan. Create it. Test it out!