Engineering

What it is, what it isn't, and why you should be doing it all the time.

Science, Engineering, & Technology

Science:

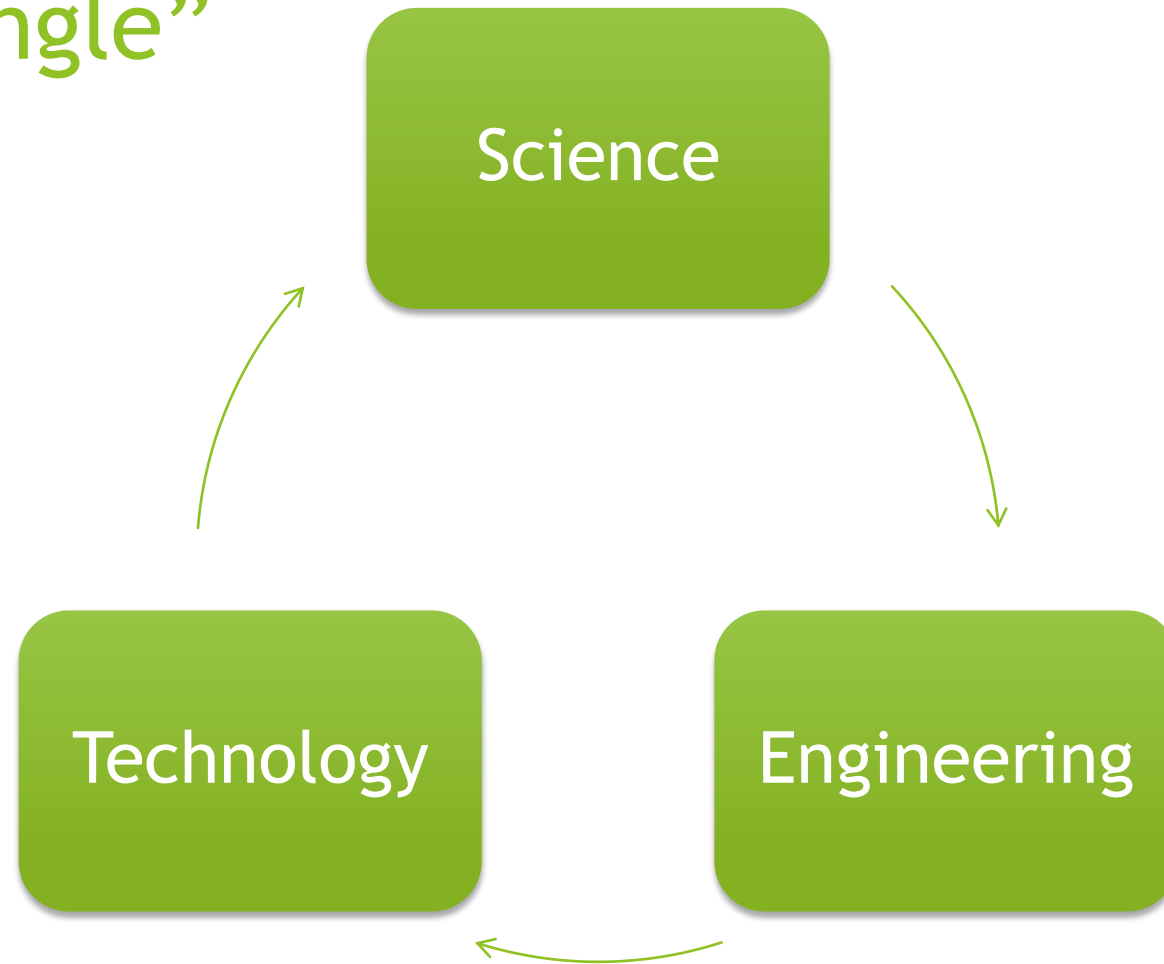Increasing human understanding of the physical world

Engineering:

Applying scientific knowledge to design and build materials, structures, machines, devices, systems, and processes

Technology:

Applying engineering to create overarching systems & networks that define the human experience

Engineering

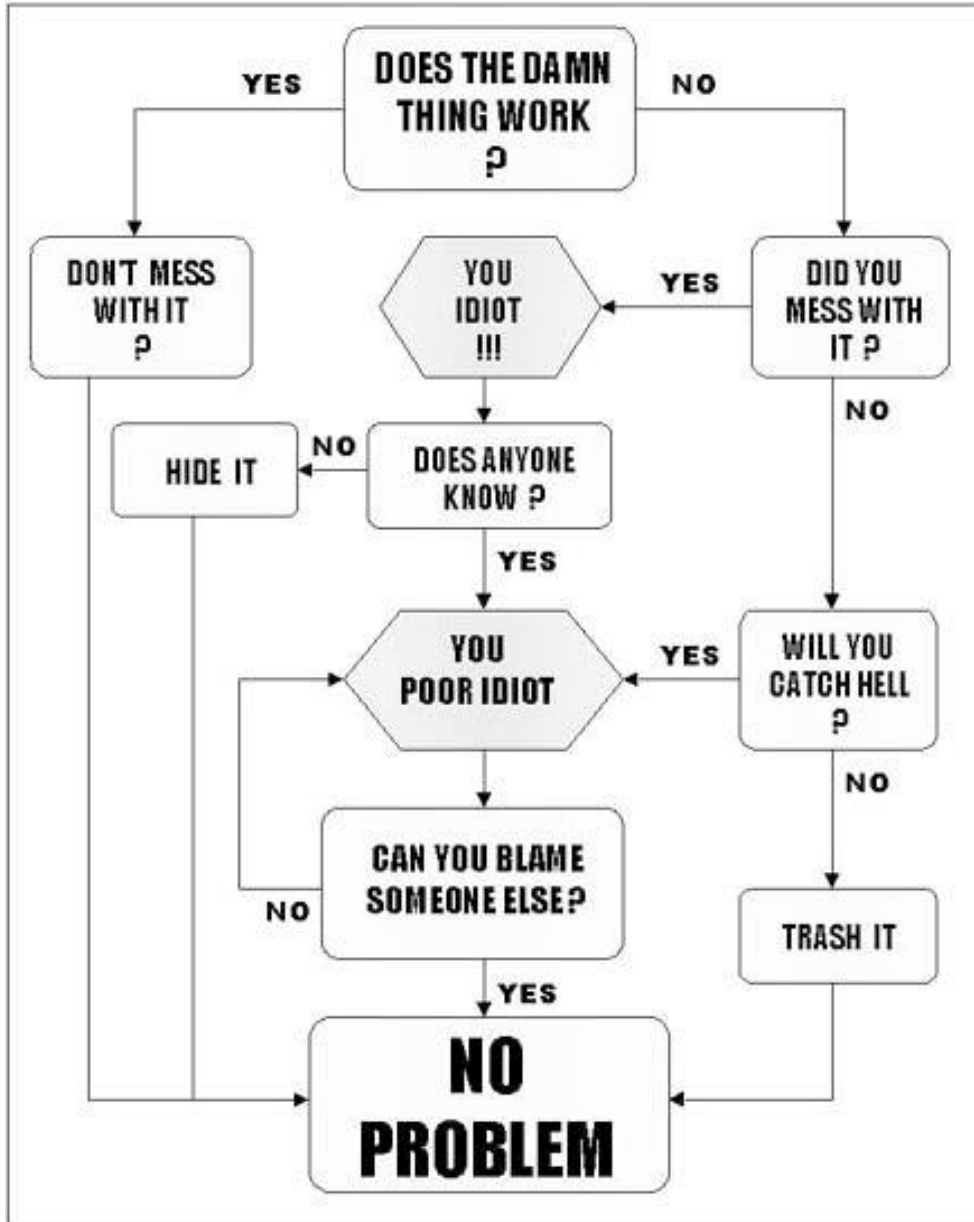| What it is:	What it isn't
▶ **Goal-oriented:** There must always be an objective to achieve ▶ **Always improving:** There is never the one "perfect" way to do/design something ▶ **Solving problems** in new ways	▶ Raw acquisition of knowledge ▶ Repeating what has already been done ▶ Not JUST building stuff

PROBLEM SOLVING FLOWCHART

- So really, engineering is just creative problem solving.

- When you solve any problem, you follow a logical progression of steps.

The Engineering Design Algorithm

1. **Ask:** Identify the need & constraints

2. **Research** the problem

3. **Imagine:** Develop possible solutions

4. **Plan:** Select a promising solution

5. **Create:** Build a prototype

6. **Test** & evaluate prototype

7. **Improve:** Redesign as needed
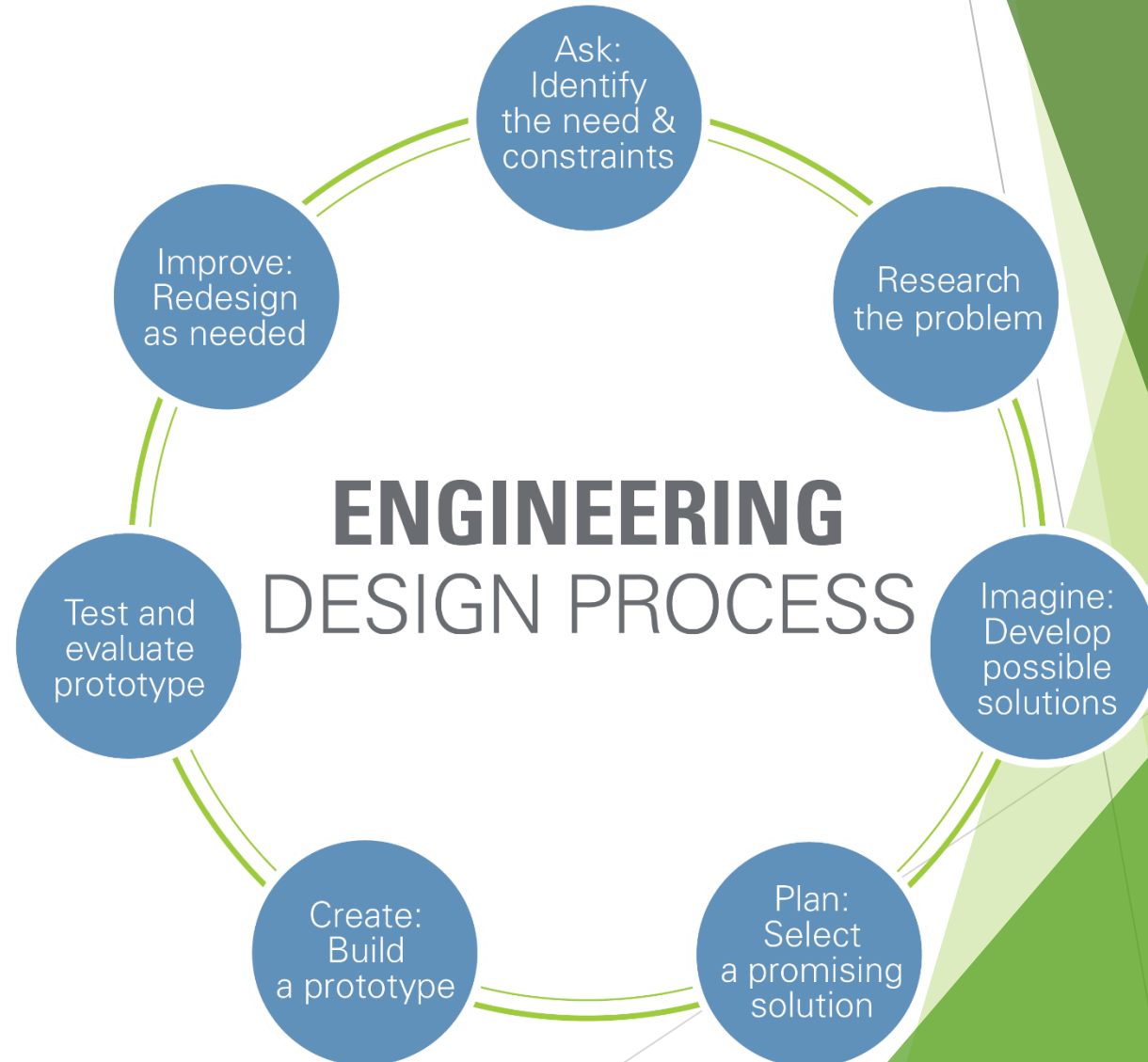
Career Opportunities

- How many "kinds" of engineering can you think of?

- Here's a short list

Ethics: With great power comes great responsibility

National Society of Professional Engineers: Code of Ethics

"… As members of this profession, _engineers are expected to exhibit the highest standards of honesty and integrity_. Engineering has a direct and vital impact on the quality of life for all people."

Your Thoughts?

► Where do you think engineers can encounter conflicts of interest with their jobs?

Your Homework for Next Class:
Best & Worst Feats of Engineering

▶ Do some research and select what you believe are the best & worst feats of engineering in humanity (your personal favorites)

▶ All cultures, all time periods

▶ Take some time to think! Remember all the different types of engineering.

▶ Be able to justify your thinking

▶ Collaborate on a class-wide Google PowerPoint, each student will do a brief, informal talk on their selections tomorrow.

Format:

► Each student creates two slides, one for Best and one for Worst

► Include:

- Your Name

- Name of the engineering feat

- At least one picture

- Small paragraph of your explanation, including the story of its development

Nobody can have duplicate feats! First come, first serve on the Google Doc.

Best: Dyson Vacuum Ms. Earnhart

- James Dyson created 5,127 prototypes of his first vacuum cleaner before developing one that he considered worked perfectly, the DC01.

- Dyson was inspired by industrial sawmill air cyclones, and used the idea to create a vacuum cleaner that nobody had ever imagined.

- Extremely high quality product, brilliant engineering.

Worst: I-35 on-ramps
Ms. Earnhart

- Extremely dangerous and poorly constructed.
- On-ramps are so short, drivers end up having to swerve in or out of traffic too quickly.
- Record number of fatalities over a very small stretch of road – one of the worst in the country.
- Original designer is rumored to have committed suicide after so many fatalities .