

### THE ROLE OF AN ENGINEER Practical application of science and math to solve real world problems.

my

### EARLY FXAMPLES OF ENGINEERING

Lever





Wheel





Wedge

# ENGINEERING MARVELS OF THE ANCIENT WORLD



Roman Aqueduct



Pyramids of Egypt

Acropolis



The Great Wall of China



### **SCIENCE & ENGINEERING**

October 4, 1957- Spuntik 1

The successful launch shocked the world, giving the former Soviet Union the distinction of putting the first human-made object into space.

**Impact on Education?** 





## THINK BACK TO 1990

- There was no World Wide Web. Cell phones and wireless communication were in the embryonic stage.
- The big challenge was the inability of the American manufacturing sector to compete in world markets; Japan was about to bury us economically.
- We hadn't even begun to inflate the dot-com bubble, let alone watch it burst.
- Terrorism was something that happened in other parts of the world.





### ADVANCEMENT IN TECHNOLOGY







### AN ENGINEER IS BEHIND EVERYTHING















### WE BELIEVE:

Construction is the work of engineers.
All knowledge is constructed.
We can solve real problems with the design process.





## ALL THINGS START WITH A PROBLEM

Engineers identify needs and problems and create a solution –

there can be multiple solutions, with no single right answer.



### Thinking.





# INTEGRATED ENGINEERING & LITERATURE



### **Possible Design Challenges**

- Growing food in the city
- Dying hair blond from brown to escaping the eyes of the Germans (chemistry)
- Designing a hiding box for people in a boat
- Learn to navigate by reading the Stars.



### **Possible Design Challenges**

- Design a nest for the ducks at the Boston Garden that would keep the ducks safe.
- Design a product that will keep the eggs warm while Mrs. Mallard visits with Michael the policeman.
- Design a way to keep the ducks together and safe on their long walk to the Boston Garden.
- Design a play area for the ducks.
- Design a way to keep the duck sculptures that are currently at the Boston Garden safe from the public (some people like to steal them!).





### DESIGN PROCESS IN WRITING







### SCIENTIFIC METHOD





# DISCIPLINARY LITTERACY

### <u>Math</u>

- Logical
- Sequential
- Problem solving
- Analyzing
- Seeing relationships

### <u>Science</u>

- Inquiry based thinking
- Problem solving
- Hypothetical reasoning
- Questioning and
   testing

#### **Social Studies**

- Global
- Impact of the past and implications for the future
- Influences
- Point of view
- Problem solving
- Primary and secondary sources (bias)

#### <u>ELA</u>

- Thematic
- Analyzing the human condition and responses to conflict
- Problem solving
- Literary language
- Communication (writing and speaking)



# APPLYING THE DESIGN PROCESS

How can you use the Engineering Design Process as an instructional framework to deliver content?



