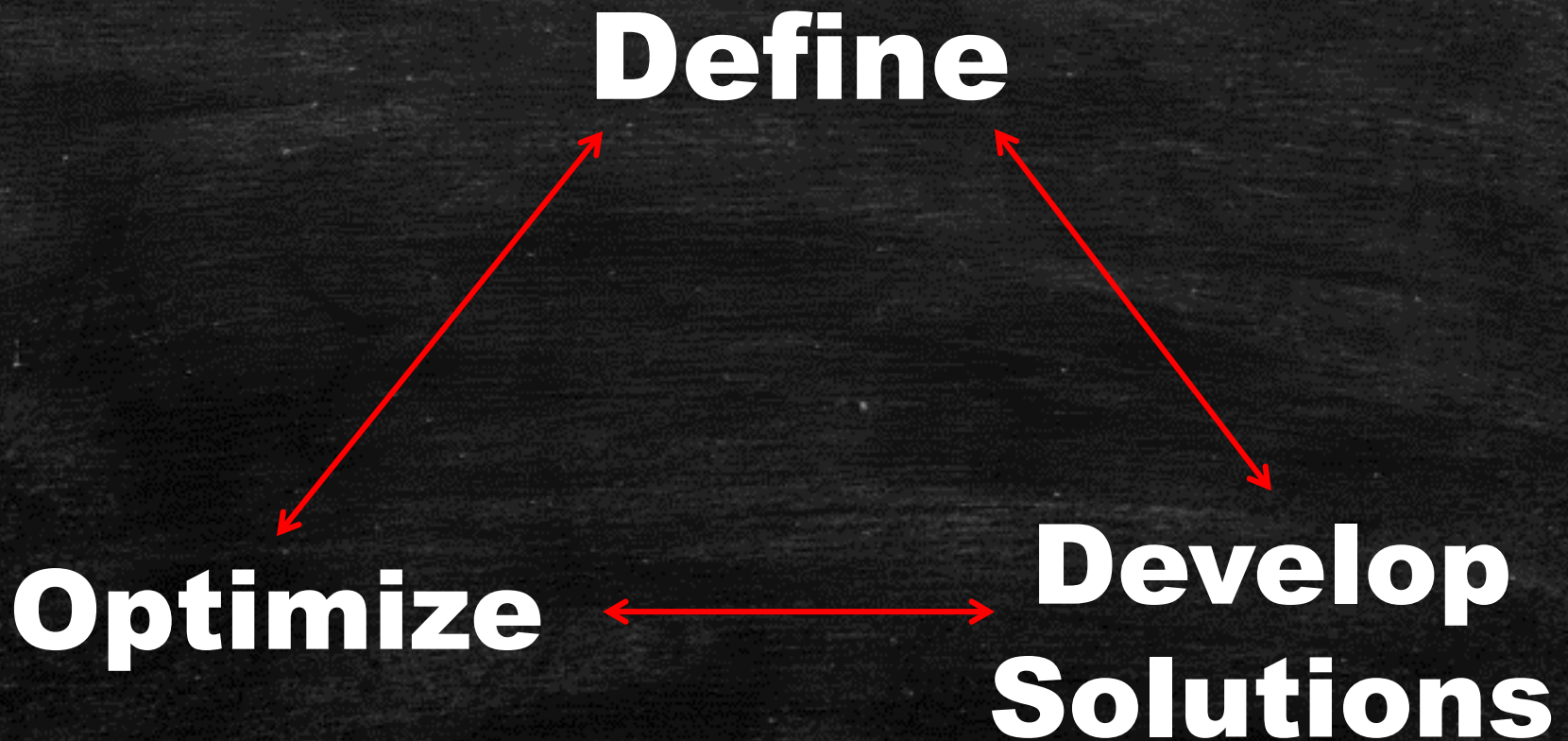


# Science Process Skills

---

# The Engineering Framework

---



# Define

---

- What is the problem?
- Identify what you must consider in order to find a solution, what are your constraints?
- Constraints- limitations to your designed solution (i.e. size, time, \$)

# Let's Define a Problem...

---

- There is a severe drought in the leading agricultural part of the state.
- It's the first day of football season and the parking lot of NC State's Carter-Finley Stadium is going to be under construction.
- This classroom must be arranged so that all the desks face the sink and the teacher desk is in the center

# *Develop Solutions*

---

- Work within constraints
- Combine possible solutions to create new ones
- Look back at previous attempts or the solutions to similar problems

# *Let's Develop a Solution...*

---

- We need to carry heavy sandbags across a beach with deep loosely packed sand
- We need to pack a carry-on sized suitcase with everything needed for a month long trip
- Kids at an elementary school are not eating their vegetables

# Optimize

---

- Test solutions and ask questions like...
  - Is this the most efficient solution?
  - Is this is least expensive solution?
  - Is this the solution that is best for the user/consumer?
  - Is this is solution that is most environmentally friendly?

# *Let's Optimize...*

---

- Road work needed to be done, currently workers are working from 1pm until 7pm
- While cooking dinner you have chicken that must go in the oven for 45 minutes, corn that must be steamed for 8 minutes and a dessert that must be in the freezer for 20 minutes



# Observation vs. Inference

---

- Observation- what you see, no interpretation just a statement of what is in front of you
  - There is a puppy putting one paw on a soccer ball
- Inference- your assumptions or conclusion based on observations
  - The puppy is playing with the soccer ball



# Qualitative vs. quantitative

---

- Qualitative- describes a *quality* of something
  - Color, texture, size, shape, etc.
- Quantative- deals with *quantity*
  - Ounces, liters, inches, etc.

# Is it qualitative or quantitative?

---

- 8 lbs.
- Rough
- After reaction the mixture was solid
- After reaction the mixture was 3 oz lighter

# Precision vs. accuracy

---

- Precision- How closely together is data grouped? How close is this data point to other data points?
- Accuracy- How close is data to the best solution?

# Is it precise?

1
2
6
14
2

1
1
1
2
2



# Is it accurate?

1
2
6
14
2



1
1
1
2
2

