Warm-Up

1) Go to the table with the nail samples and observe each nail. **DO NOT** touch the test tubes or nails!

2) Get a printout of today’s notes (*next to the nails*) and head back to your seat.

3) Individually (*yes, without talking)*...
   Write your observations, explanations, and any questions that you have at the top of your notes.
Turn, Talk, & Share

1) In small teams (2-4), take turns discussing what you wrote about the nail samples.

2) After a few minutes of discussing, we will share out as a class! *Students will be called on randomly... be ready to share one of your notes!*

Picture Credit: [https://torange.biz/nails-screw-fasteners-2909#](https://torange.biz/nails-screw-fasteners-2909#)
What do you already know about Corrosion?
What do you WANT to know about Corrosion?
How Can We Prevent the Corrosion Crisis?
I will be able to...

- explain corrosion in my own words.
- explain why some metals rust or oxidize.
- provide examples of corrosion in everyday life.
The Cost of Corrosion

- Public Health & Safety
  - Infrastructure
    - bridges
    - roadways
    - Buildings
  - Water pipes and tanks
    - Flint Water Crisis

Picture Credit: https://upload.wikimedia.org/wikipedia/commons/6/6b/I35_Bridge_Collapse_4crop.jpg
The Cost of Corrosion

- Corrosion Costs Money
  - In 2013, the total cost of corrosion in the U.S. was $451.3 billion.
    - Agriculture
    - Industry
    - Services
  - It’s estimated that corrosion costs about 3.1% of the country’s total GDP.

Video Credit: Transhiel
Time to Read!

- Read the article from CK12.org
- Highlight or underline key ideas
- Look for vocabulary
- Write comments or questions

We will refer to this later!
CORROSION

Video Credit: The Fuse School
What did you LEARN about Corrosion?
• What is a metal?
• What types of properties do they have?
What is a Metal?

- A type of matter that is a good conductor of heat and electricity.
  - Typically hard
  - Lustrous
  - Ductile
  - Malleable
  - Fusible
What is corrosion of a metal and why does it occur?

Is corrosion the same as rust?
**Corrosion**

- Chemical change of a metal surface when it’s exposed to oxygen in the environment.

**Rust**

- Form of corrosion, specifically for iron and its alloys.
- A reddish- or yellowish-brown flaky coating of iron oxide.
● What are some examples of corrosion that you’ve seen in your everyday life?
Are all Metals Equal?

● Some metals do not corrode easily due to their low reactivity.
  ○ Gold, Platinum, Silver
● When oxidized, other metals form a coating on the surface. This protects the metal from further corrosion.
  ○ Aluminum
  ○ Copper
● Complete corrosion of metal
  ○ Iron
● How can corrosion be prevented?
Preventing Corrosion

- The **rate of reaction** is how fast a chemical reaction takes place.
  - In other words, how fast a product is formed or a reactant is used up.

- One of the factors that determines the speed of a reaction is the **surface area**.
  - In this case, **surface area** is the amount of reactant that is exposed to other reactants in a chemical reaction.
  - The **greater** the surface area of a solid reactant, the **faster** its rate of reaction.
Preventing Corrosion

● Create a physical barrier
  ○ Paint, enamel, oil
  ○ Issues?

● Coat with another metal
  ○ “Tin cans”
  ○ Galvanizing

● Cathodic protection
  ○ Prevent hulls of steel ships from rusting
What do you STILL want to know about Corrosion?
Parking Lot

- 2-3 students per group
- 1-2 sticky notes
- Each sticky note should only have ONE comment or question from the “S” category of your KWLS chart
- When you’re done, bring your sticky notes to the board.
Corrosion Classroom Challenge!

How can you design a ship that holds cargo and holds up against the elements?