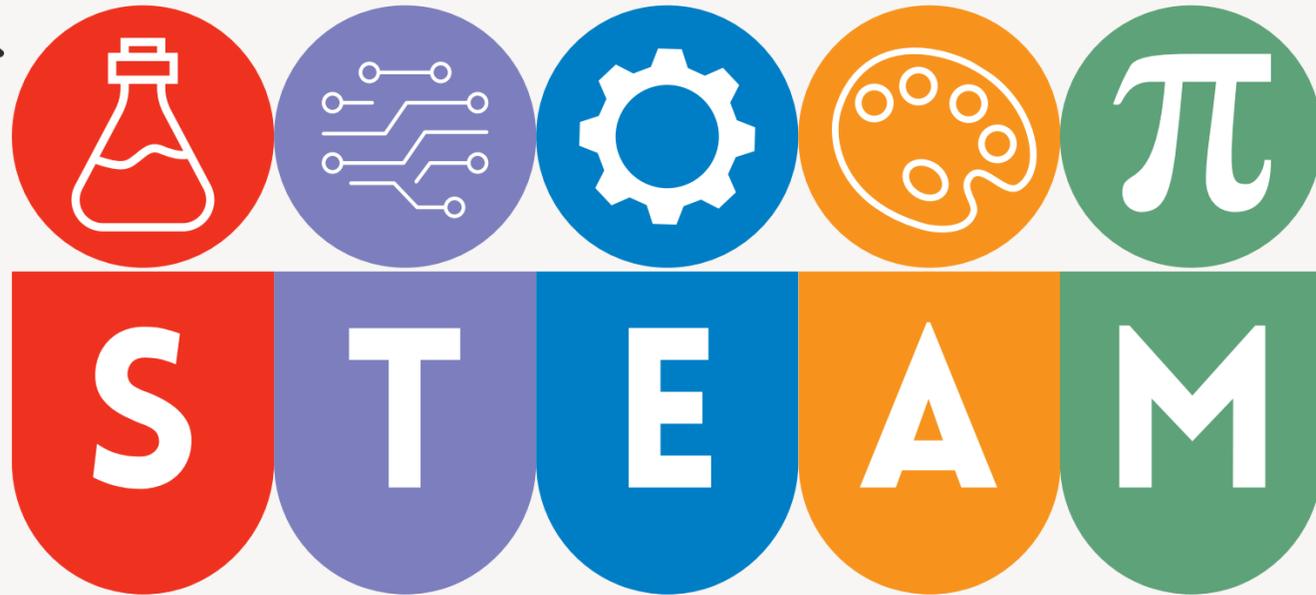
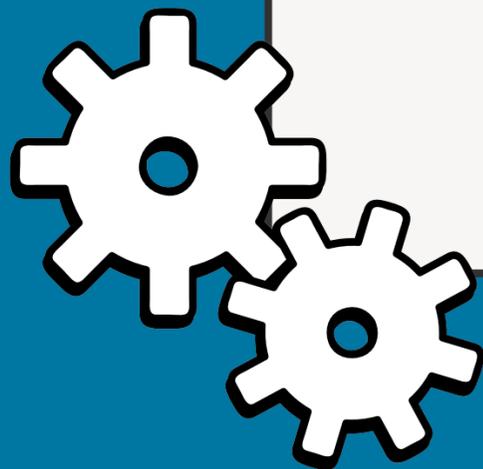


CLIL



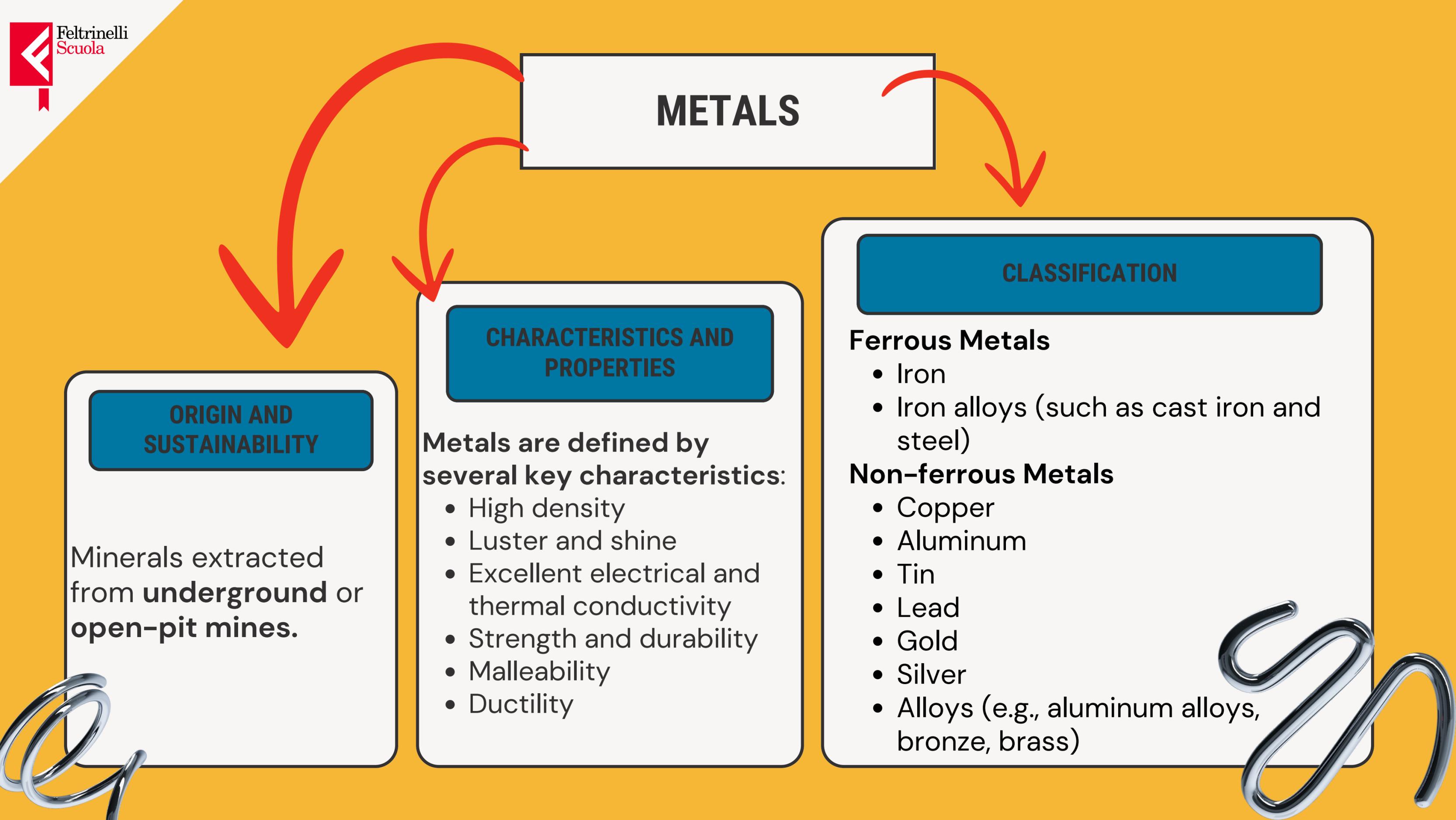
MATERIALS • UDA 8: Metals



1. CREATE YOUR OWN MAP

Have a look at the mind map in the next slides, then **sketch your own version in your exercise book.**





METALS

ORIGIN AND SUSTAINABILITY

Minerals extracted from **underground** or **open-pit mines**.

CHARACTERISTICS AND PROPERTIES

Metals are defined by several key characteristics:

- High density
- Luster and shine
- Excellent electrical and thermal conductivity
- Strength and durability
- Malleability
- Ductility

CLASSIFICATION

Ferrous Metals

- Iron
- Iron alloys (such as cast iron and steel)

Non-ferrous Metals

- Copper
- Aluminum
- Tin
- Lead
- Gold
- Silver
- Alloys (e.g., aluminum alloys, bronze, brass)

METALS

SIDERURGY

From Iron to Cast Iron and Steel

- **Blast furnace:** Iron ore is smelted with coke and limestone to produce pig iron.
- **Continuous casting:** The molten steel is solidified into semi-finished forms.
- **Rolling and forming:** Hot or cold rolling shapes the final product.

MAIN APPLICATIONS

- Construction
- Transport
- Mechanical engineering
- Electronics
- Medicine
- Everyday objects

ORIGIN AND SUSTAINABILITY

- Finite Resources
- Recyclable Resources

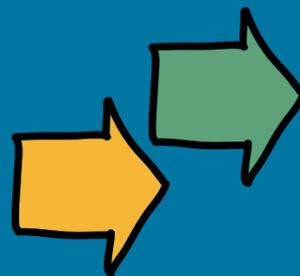
Siderurgy:

- High Energy Consumption
- CO₂ Emissions
- Industrial Pollution



2. CREATE YOUR OWN TEST

a. Indicate whether
the following
statements are true
(T) or false (F).



1 All metals are solid.

 T F

2 Precious metals have a high specific weight.

 T F

3 The blast furnace is used to produce
aluminum ingots.

 T F

4 Rust is one of iron's advantages.

 T F

5 Metals can be easily recovered and recycled.

 T F

3. ANALYSIS OF GLOBAL STEEL PRODUCTION DATA



The table shows steel production from 2020 to 2023 for the leading producing countries, expressed in thousands of tonnes. Which country is the largest producer of steel in the world? Do you think this has an impact on the global economy? How has steel production trended in recent years? Is it increasing or decreasing?

Year	China	India	Japan	United States	Russia
2020	1,053	100	83	72	71
2021	1,032	110	96	86	76
2022	1,018	118	92	81	73
2023	1,015	122	89	79	70

Represent the data in the graph/chart you think is most appropriate. You can also focus on a single producing country. Draw it on graph paper, millimeter paper, or use a worksheet.

4. METALS AND ALLOYS USED IN OUR COINS



Each coin in circulation within the European Union has different sizes and increasing weights, depending on its value. Coins of lower value (1 and 2 cents) are very light and are set to be removed from circulation since they are no longer minted. Coins of intermediate value (5, 10, 20, 50 cents, 1€ and 2€) are thicker and heavier, both in terms of size and due to the different alloys used. **But what metals and alloys are used in each coin?** Why are some metals chosen over others?

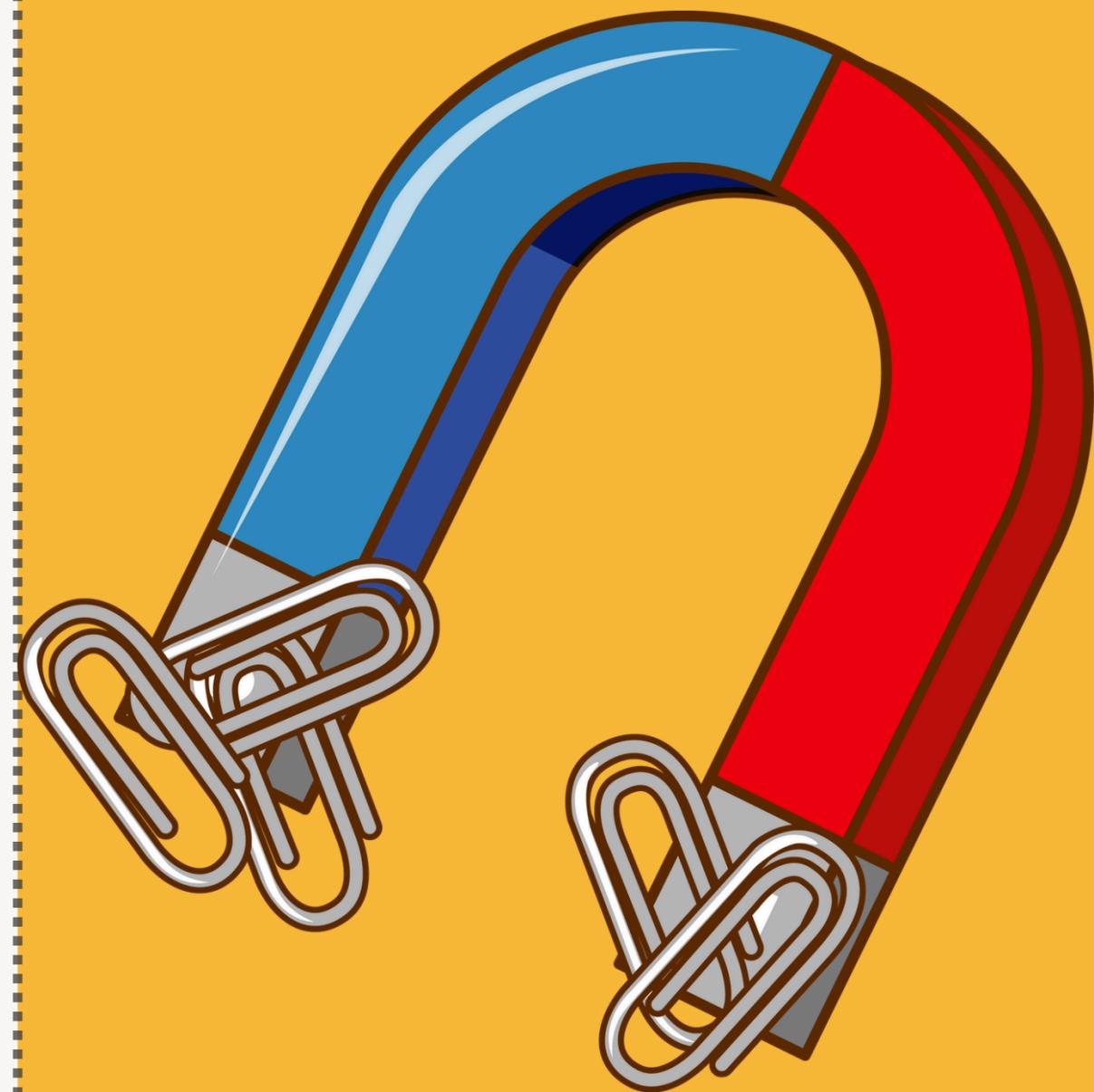
Do some research online and create a brief written or multimedia presentation to share in class.

To explore the magnetic properties of metals, all **you need is to collect a few small metal objects commonly found at home or at school** (keys, paperclips, nails, compasses, coins, screws, etc.). Bring them close to a permanent magnet (a magnet) and observe their behavior: **is the object attracted to the magnet or not?**

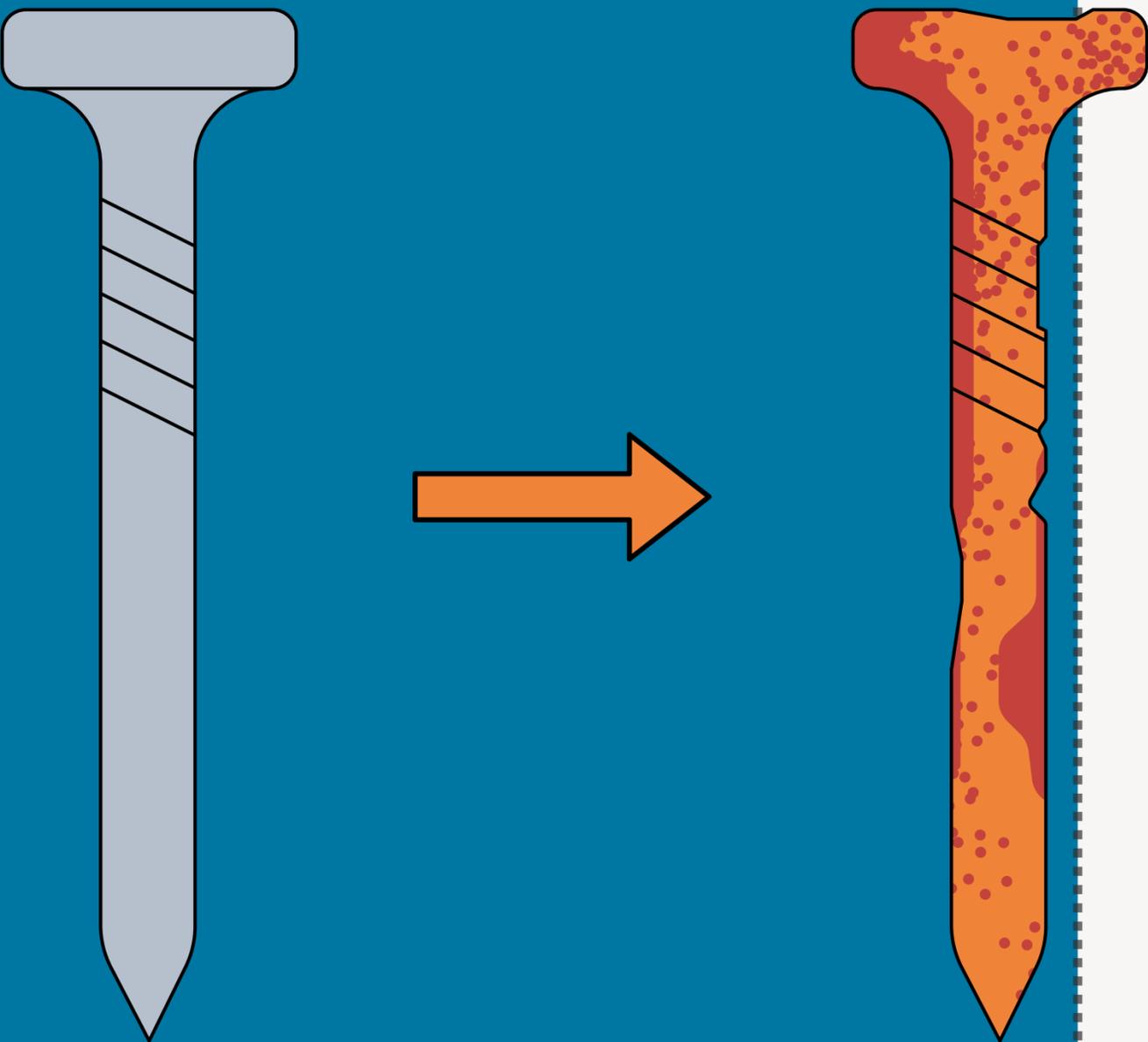
If it contains iron, then it definitely will be! But also nickel, cobalt, and chromium... **Create a table to record the results of the experiment.**

What do you think are the practical uses of this phenomenon? We will explore them further when we discuss electricity.

5. MAGNETIC EXPERIMENTS



6. CORROSION OF METALS



To study the corrosion process of metals, we can immerse some iron nails in different solutions (saltwater, tap water, and water with baking soda). After a week, observe and record the amount of rust that forms on each nail.