

MAGNETISM



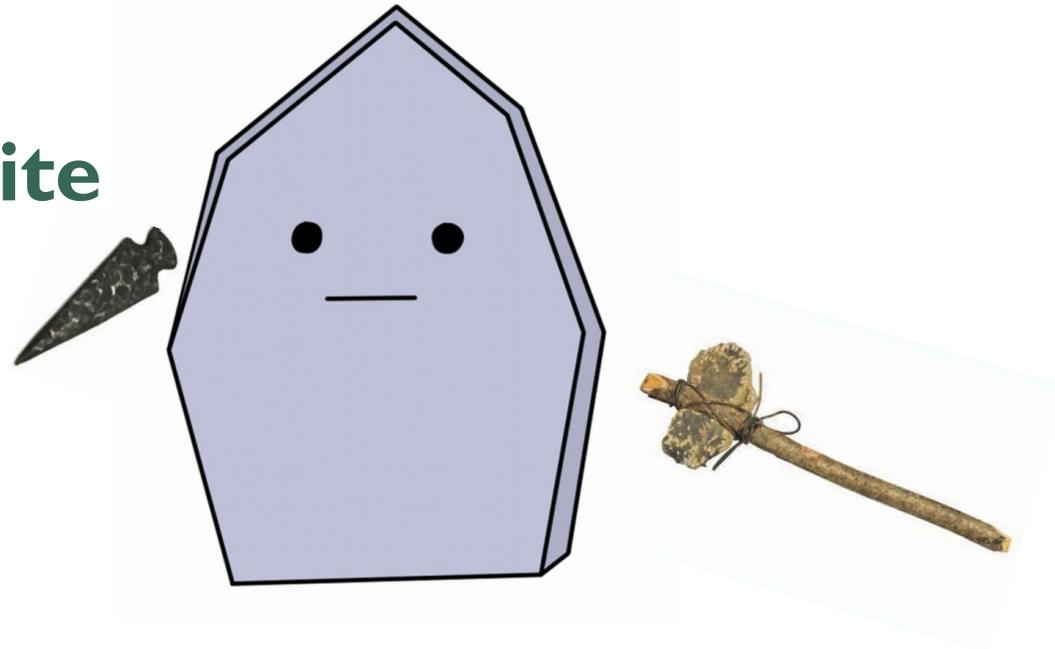
What is magnetism?

What is a magnet?

**What does it mean for
something to be magnetic?**

STORY TIME!

- Once upon a time, sometime around 600 BC in the region of Magnesia the Greeks discovered a mysterious rock...
- This rock (or ore) had the ability to attract small iron objects towards it.
- They named this ore **Magnetite**



A FEW DEFINITIONS

- **Magnetism:**

- **All the phenomena that are caused by magnets**

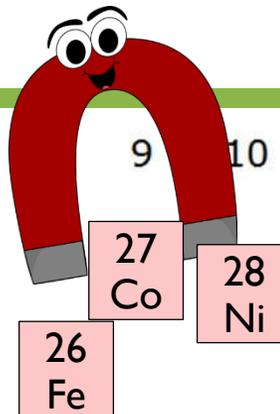
- **Magnet:**

- An object that produces a **magnetic field**
 - Can attract **ferromagnetic** materials
 - Can attract or repel **other magnets**

A FEW DEFINITIONS

- **Ferromagnetic:**
 - Something that contains **iron, cobalt or nickel**
 - **Readily attracted to a magnet**

Group → 1 2 3 4 5 6 7 9 10 11 12 13 14 15 16 17 18
 ↓ Period



1	1 H								27 Co	28 Ni							2 He	
2	3 Li	4 Be							26 Fe			5 B	6 C	7 N	8 O	9 F	10 Ne	
3	11 Na	12 Mg										13 Al	14 Si	15 P	16 S	17 Cl	18 Ar	
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn			29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr	
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba	* 71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra	** 103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Fl	115 Uup	116 Lv	117 Uus	118 Uuo
			* 57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb		
			* 89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No		

A FEW DEFINITIONS

- **Ferromagnetic:**

- Something that contains **iron, cobalt or nickel**
- **Readily attracted to a magnet**

- **Non-magnetic:**

- Objects/elements that are **not affected by a magnetic field**
 - **Most elements** (including **metals**) are non-magnetic

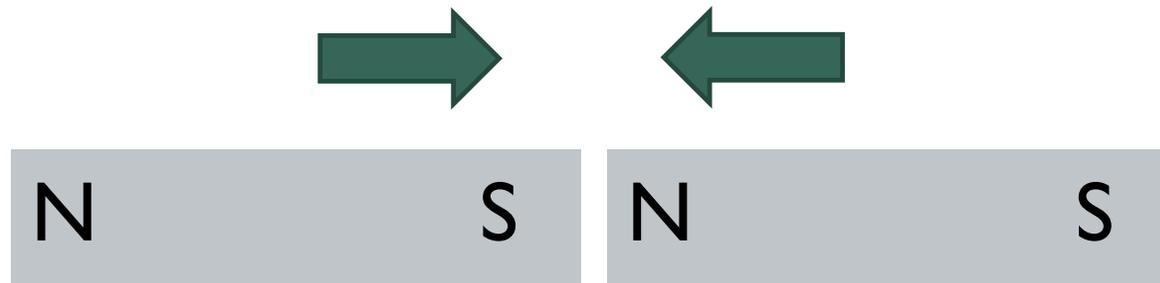
LAWS OF MAGNETISM

- Every magnet has **2 ends**:
 - A **north** and a **south pole**
 - If you cut a magnet in half, **each half will still have a north and a south pole**



LAWS OF MAGNETISM

- **Laws of magnetism:**
 - **Opposite poles attract**



LAWS OF MAGNETISM

- **Laws of magnetism:**
 - **Opposite poles attract**
 - **Like poles repel**



LAWS OF MAGNETISM

- **Laws of magnetism:**
 - These forces of attraction and repulsion are dependent on **distance**
 - The **larger the distance** between magnets, the **weaker the attraction or repulsion**



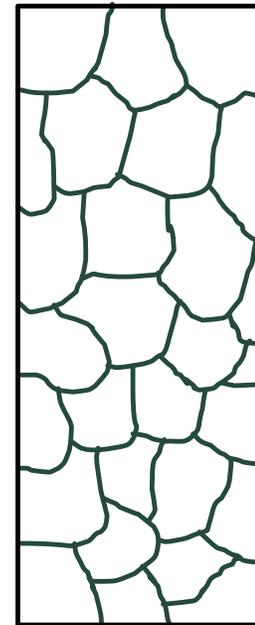
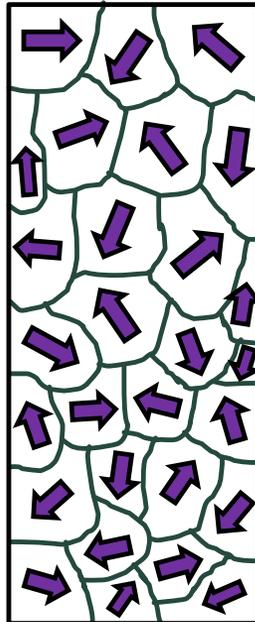
Have you ever noticed how
some substances can sometimes
act like magnets and sometimes
not?

MAGNETIC DOMAINS

- Ferromagnetic substances consist of **tiny magnetic regions** (called '**domains**') that act like many **small magnets** within the material.
- Normally, the magnetic fields are in **random directions** and therefore **cancel out**.

MAGNETIC DOMAINS

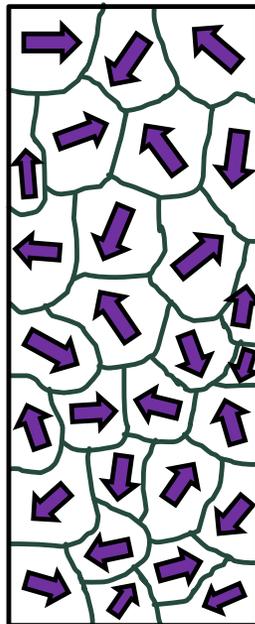
Random domains;
Demagnetized



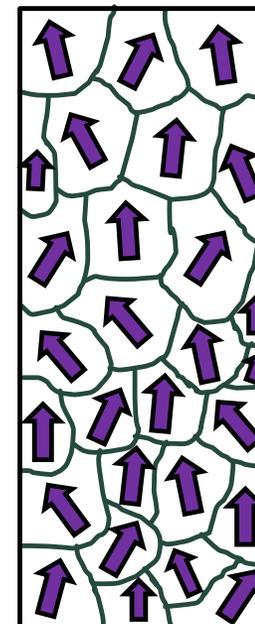
MAGNETIC DOMAINS

- If the domains line up, the material becomes **magnetized**.

Random domains;
Demagnetized



North pole



Aligned domains;
Magnetized

South pole