MagLev Trains: Magnetism

https://www.youtube.com/watch?v=aIwbrZ4knpg

1. Did the trains in the video rely on permanent or temporary magnets for levitation and propulsion?

Temporary Magnets (Electromagnets) The magnets in the video could be turned on and off by electricity

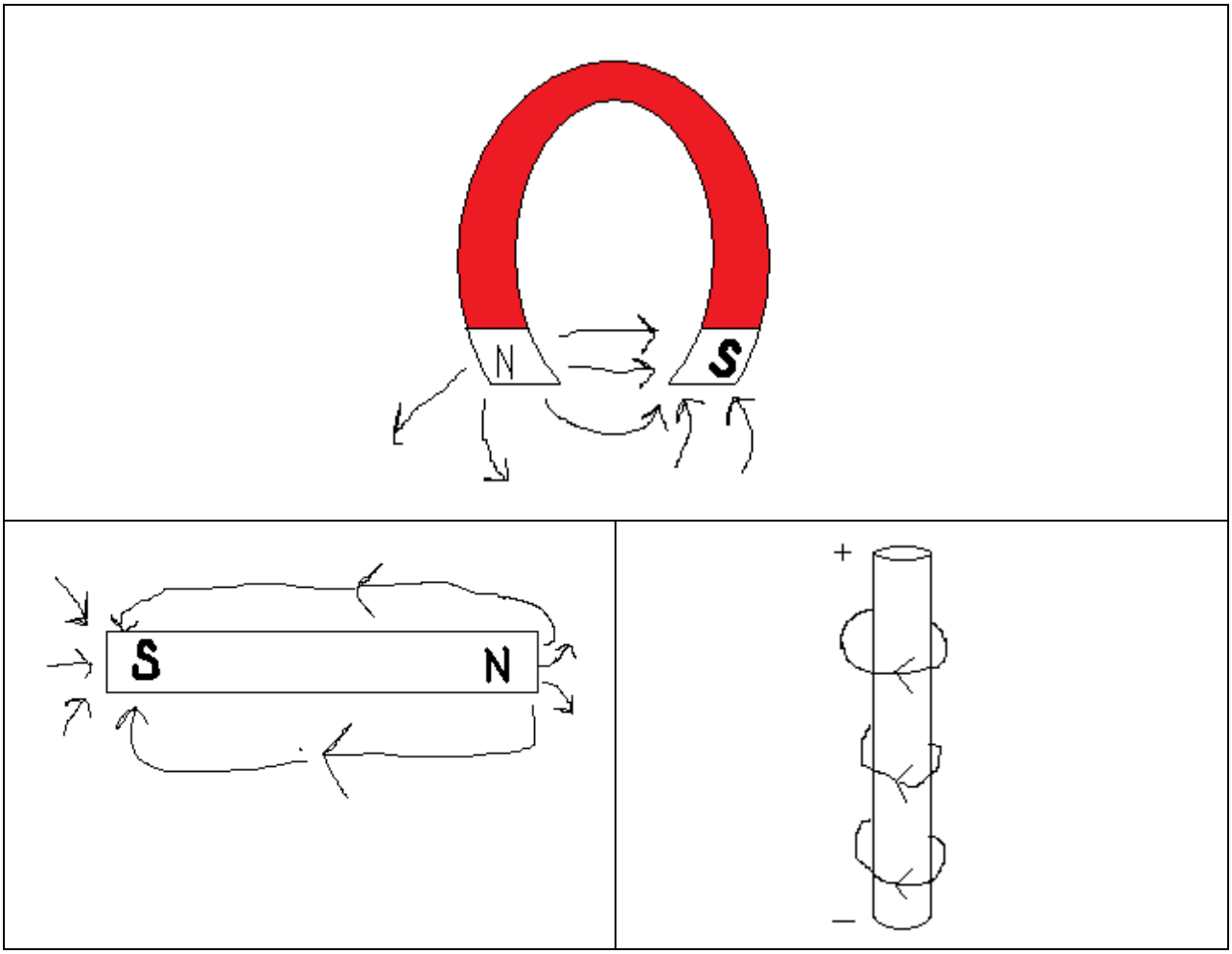
2. What properties of magnets did the German and Japanese engineers use to make their high speed trains levitate (float) above the tracks?

German Engineers (TransRapid)	**Japanese Engineers (JRMagLev)**
Attraction, the magnets would rapidly switch off and on to allow the train to float above the track.	**Repulsion**, two magnets would be positioned north-north or south-south to repel one another (one on the train cars and the other on the tracks) and cause the train to levitate.

3. How do MagLev trains compare to conventional coal or deisel locomotives. What are some of the advantages and disadvantages of MagLev technology?

Advantages	**Disadvantages**
Less friction, only needs air resistance Can be run on renewable electricity rather than coal or diesel Much faster than conventional trains Quieter than conventional trains	Very expensive to build track New track must be constructed

4. All magnets produce magnetic fields. For the 3 magnets below draw the field lines and indicate the direction of the magnetic field.



5. The compass is an incredibly old technological use of magnetism. Traditionally the red needle (North Pole) on the compass points north. How does this work in relation to what we know about magnets?

The compass aligns with the magnetic field of the planet. Earth's magnetic South Pole is at the geographic North Pole. So the north pole of a compass needle points towards **magnetic "South"** which is the same as **Geographic "North".**

This matches our theory of magnetism in that opposite poles attract, North is attracted to South and vice-versa.