Ojas Patil

Fairview school

Maglevs

Science Fair 2023-24

24 Dec 2023

Write down all the questions about the topic. Questions like what is levitation, how Maglev works, which are the fastest trains.

There are many questions. I have to update my file for more questions

25 Dec 2023

I started searching for answer on internet. There's tons of information. I need to sort the information and find the important data. I have to save the links also to read them later.

I found lot of information about levitation, magnetic levitation

27 Dec 2023

Im finding more information of how maglevs work and how high speed trains work.

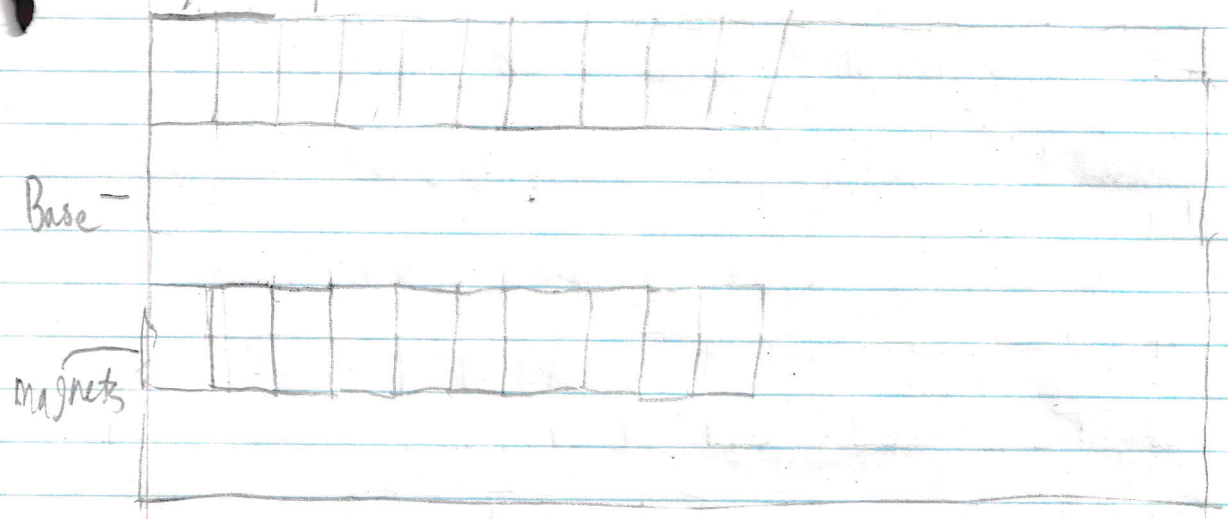
Maglevs have three systems called guidence, propulsion, levitation.

High speed trains use wheels and tracks to move and electrcity to power up the engine.

Interstingly, most of the high speed trains run on a track gauge of 1435mm which is also known as standered gauge. And there are more than 25 diffrent track gauge.

magnets

28 Dec 2023



Today Im going to start building my model as shown in the digram above

Observations:

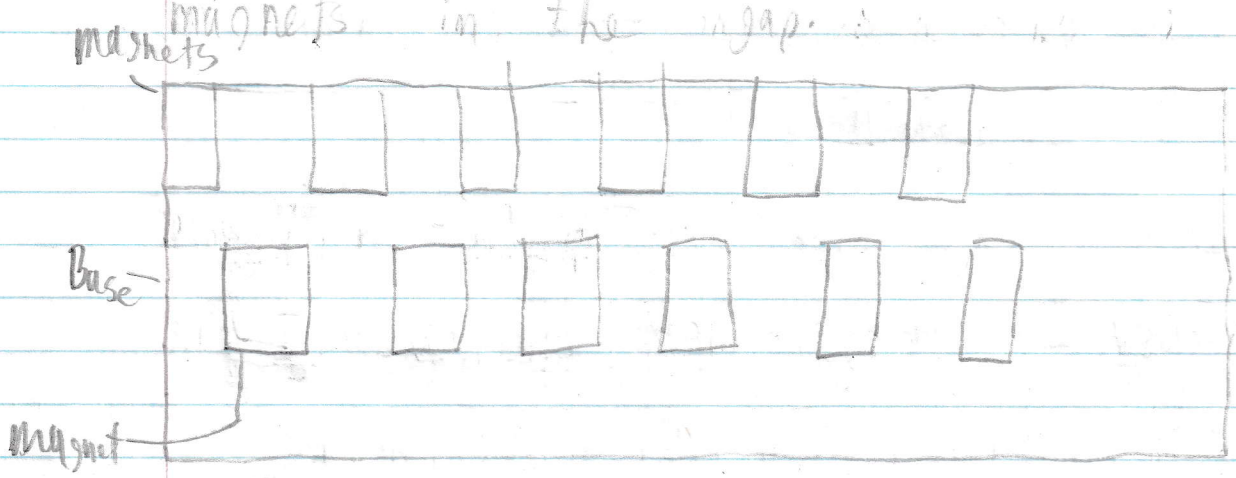
It is very hard to glue magnets so close.

The train kept on flipping over and over again.

The train needs supports on sides to stop moving on sides.

30 Dec 2023

I put a magnet gap in between the glued magnets. On the other side I put magnets in the gap.



Observation:

This method didn't help it move.

The train kept flipping, I need to solve this first.

Finding similar poles is taking lot of time, I need to find sollution.

1 Jan 2024

Today I went back to researching about Maglevs.

The guidence system helps the train to stay on track.

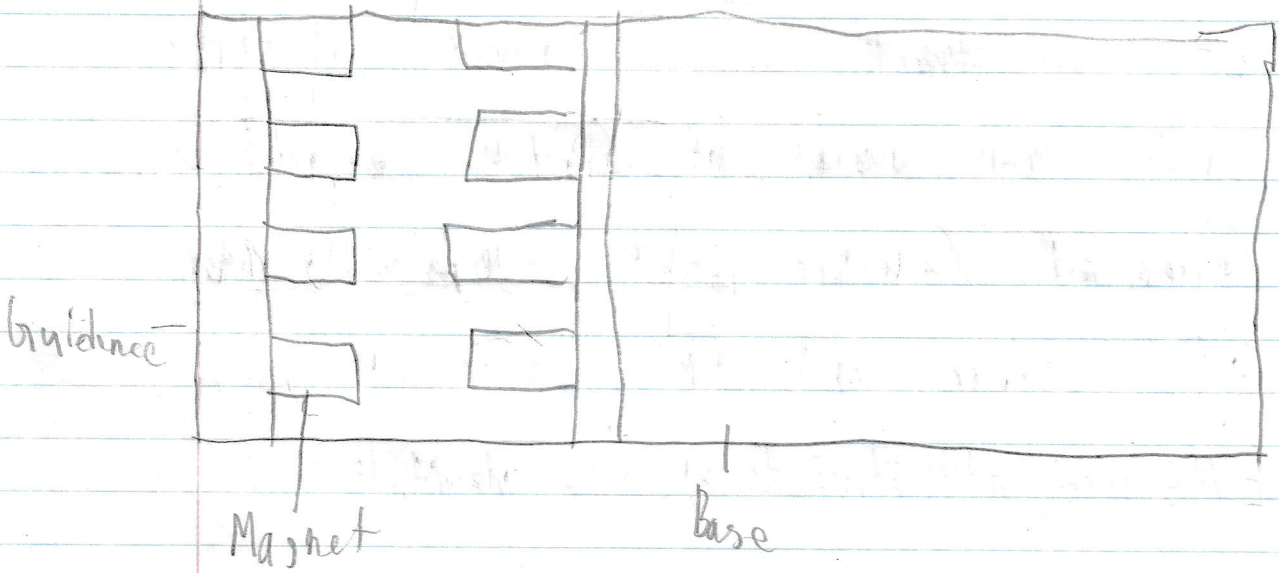
There two types of maglevs technologies called EMS (Electro Magnet Suspenions) and EDS (Electro Dynamics Suspenions).

EMS uses attrative force to levitate the train.

EDS uses repulsive to levitate the train.

2 Jan 2024

I put tape iddentiffy similar poles.
Now I am making a small model
with guidence to stop it from flipping



Observation:
Guidence is helping the train not flip.
Next time I will make a
bigger model

3 Jan 2024

My small model was sucessful, I want to gather more ideas to make my bigger model better.

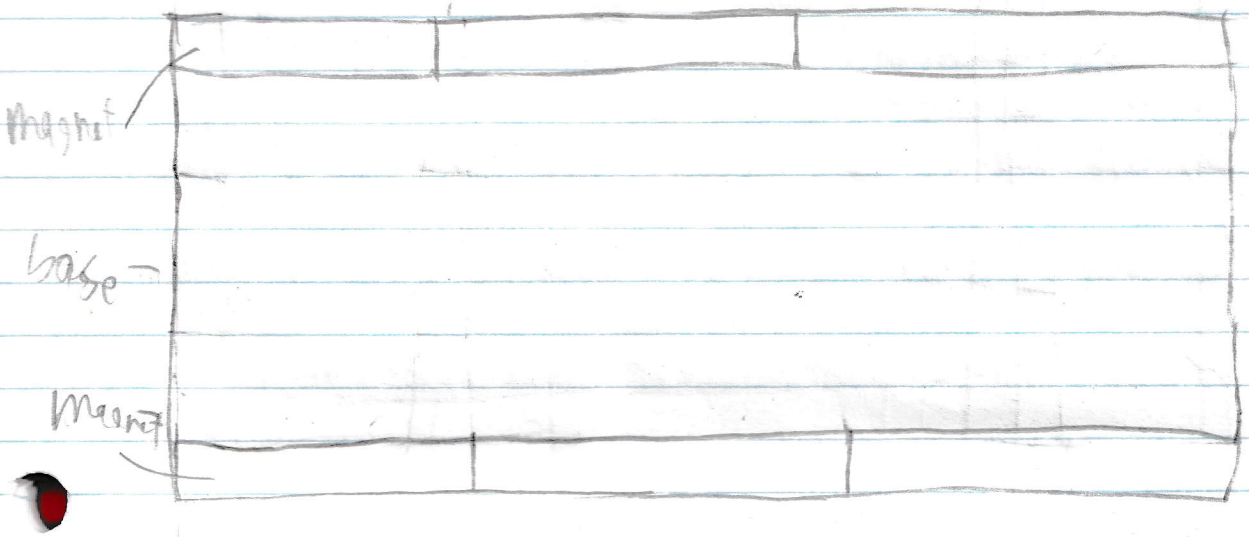
I can use bigger magnets as tracks and small magnets as train base.

I build track inside container, so the walls will act like a guidance.

Also I can try gluing magnets on the guidence.

4 Jan 2024

I decided to glue long magnets on the base and small magnets on train



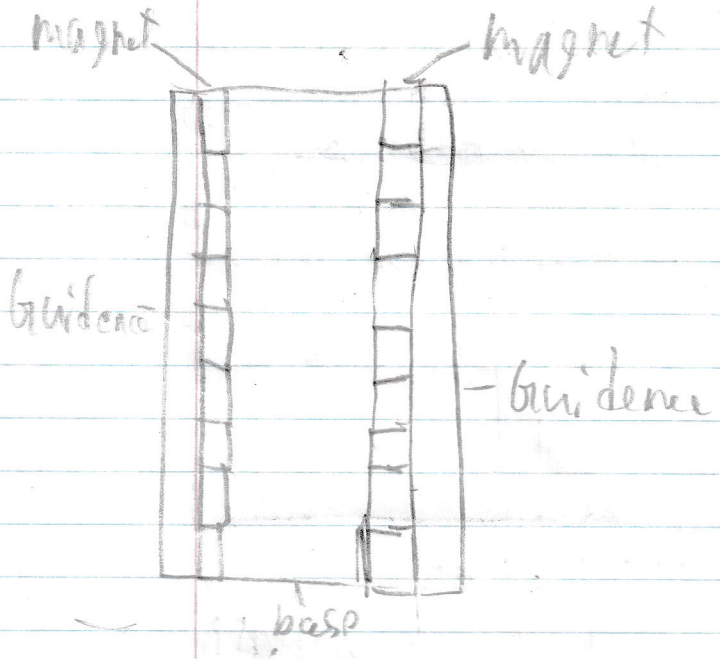
Observations:

The train floated with wall as one side guidence.

I need transparent walls as guidence on both sides

6 Jan 2024

I bought a container to glue magnets on the sides and made a train



Observations:

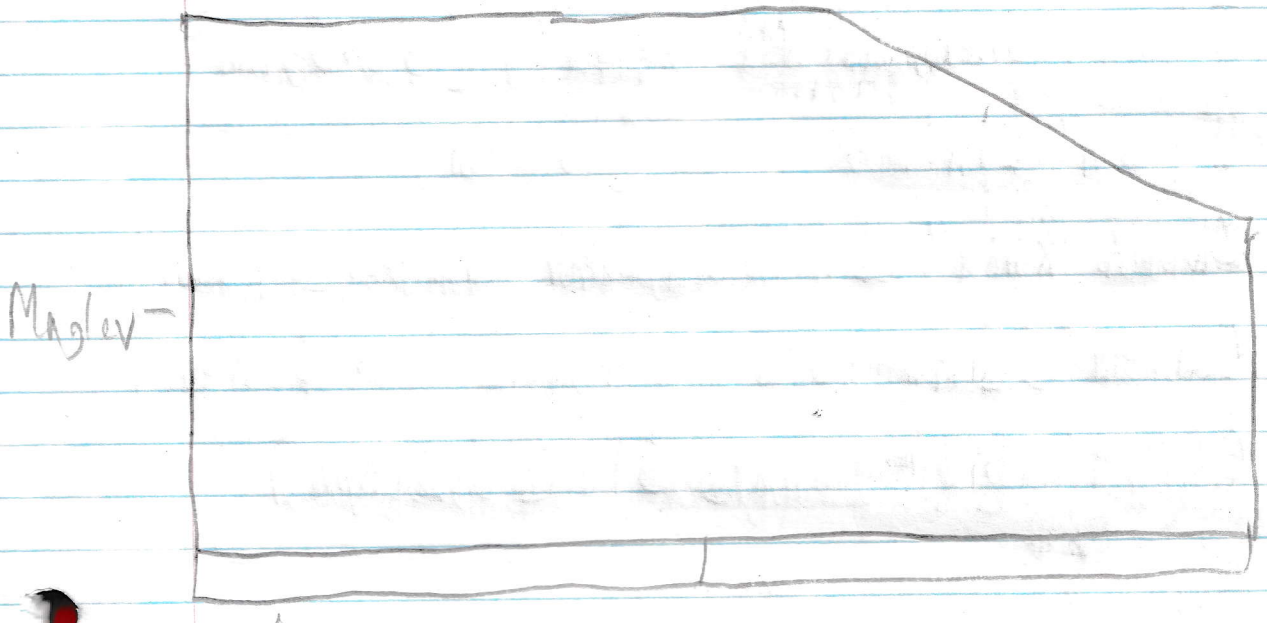
Small cardboard train is floating.

With transparent walls, magnetic levitation can be seen clearly.

I need to make styrofoam model of train.

7 Jan 2024

Now I'm going to make the styrofoam train model.



Observation:

The train worked well.

The train can slide perfectly fine.

11 Jan 2024

Now I'm searching about maglev trains in the world.

China: Shanghai Maglev train (30.5 km)

Japan: Linimo line (9 km)

South Korea: Incheon Airport Maglev (6.1 km)

China: Changsha maglev (18.55 km)

China: Beijing line S1 (8.2 km)

There are some other maglev under construction like Chūō Shinkansen and Qingyuan maglev.

13 Jan 2024

Im curious to find which are the fastest Maglev trains in the world.

Japan: L0 series (603 kph)

China: CRRC 600 (600 kph)

Germany: Transrapid (550 kph)

China: Shanghai Maglev (431 kph)

China: Changsha Maglev (600 kph)

14 Jan 2024

Need to collect more information about fastest high speed trains.

Frace : French TGV (574.8 kph)

China : Bejing Shanghai HSRS (350 kph)

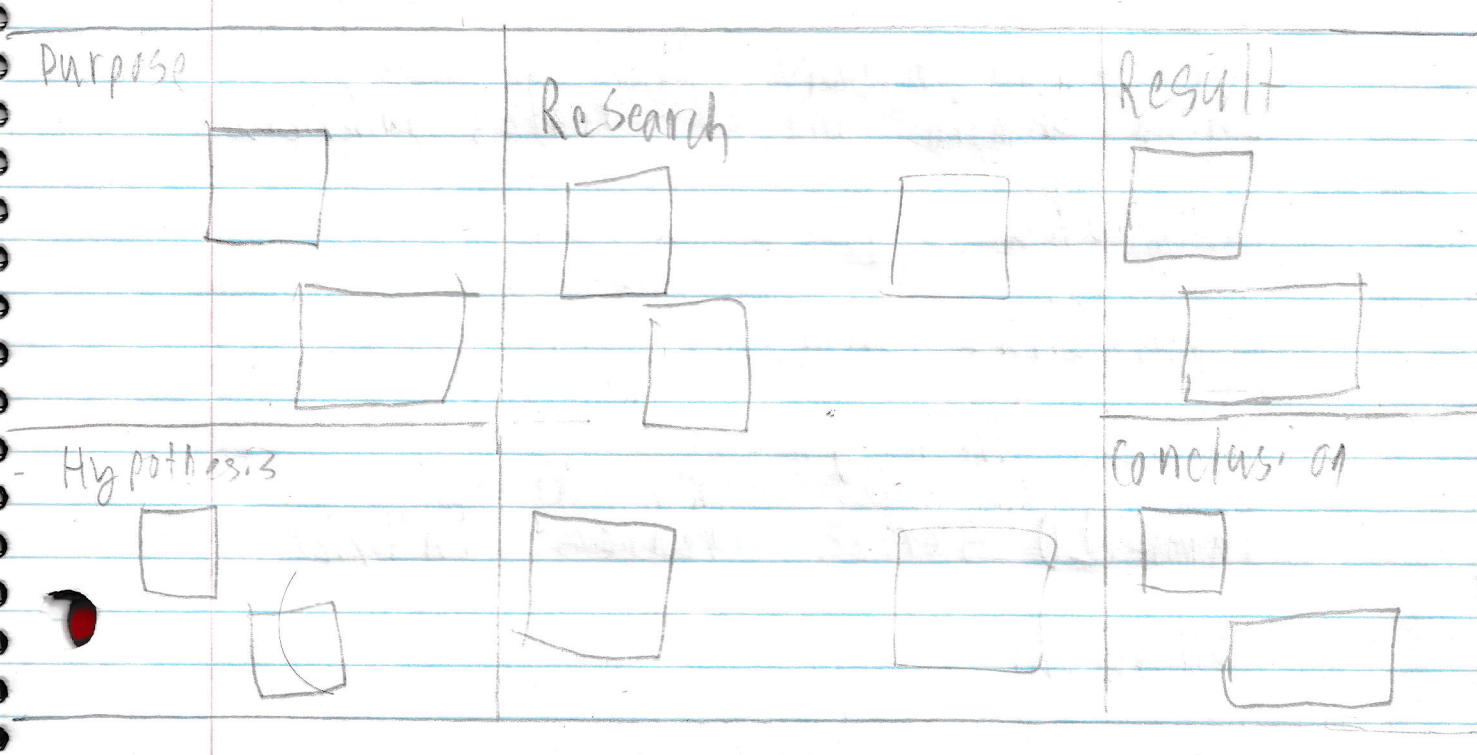
Frace : LGV Sud-Est (300 kph)

Korea : KTX (300 kph)

China : CR400 Fuxing (250 kph)

15 Jan 2024

My trifold design idea is like this.



Add chart.

Maglev and HST photos

18 JAN 2024

Are Maglevs eco friendly?

China: Shanghai maglev creates indirects pollution.
Japan: Chūō Shinkansen is known for eco friendlyness.
Japan: LO series creates indirect pollution.
Korea: Incheon Airport Maglev is nickname is ecobee, that stands for eco friendly.
Japan: SC maglev uses green energy.

20 Jan 2024

How much do Maglevs cost?

China: Shanghai Maglev costs $1.5 billion

Japan: Chūō Shinkansen costs $1.7 billion

Japan: LO series costs $74.7 billion

Korea: Incheon Airport Maglev costs 590.95 million.

Japan: SC Maglev costs $10 billion to $15 billion bucks.

8 Feb 2024

I wanted to keep researching about maglevs and how are these futre maglevs.

Japan: Chūō Shinkansen going be made in 2027.

Japan: SC maglev is coming in 2037.

Japan: LO series is realsing in 2037.

10 Feb 2024

I found research on energy consumption of track based high speed trains and maglevs. This research considers energy consumption values for trains of different lengths, widths, and speed. The only High-speed Maglevs systems can be operated economically at significantly higher speed. If the goal is to reduce travel time and thereby achieving high speed transport systems, then the Maglev will show a promising option from an energy consumption point of view.

11 Feb 2024

SC maglev details:

What is a linear motor?

A linear motor is like a conventional rotating motor that is opened and extended linearly. It uses magnetic action to move the train.

What are superconducting magnets?

Superconducting magnets are magnets that cooled down (almost to absolute zero) to reduce electrical resistance.

Mechanisms preventing crashes.

When the train goes on the right side the left side attracts and right repels same thing on the other side

15 Feb 2024

HSWT	Maglev
Mississauga train. Bejing HSR. Akita Shinkensen.	Shanghai maglev. Linimo maglev. Beijing line S1 maglev.
If they operat at higher speed the wheels may slip.	The air drag is slowing them down
40,500 kilometers.	

Feb 17 2024

Eco friendly about maglevs. This can be evaluated on different criteria's as CO_2 emissions, noise pollution, and more.

CO_2 emission's:

The Maglev has signtificantly lower CO_2 emission compared to HSWT at 300 kph. At 900 kph Maglev emits half the amount of cars.

Environmental:

Maglev trains create no direct pollution emission. Meanwhile cars and airplanes create air pollution.

Land:

Maglevs require only 12 m of wide. HSWT requires 14 m of wide.

Noise:

Maglevs create less noise than HSWT.

Feb 29 2024

Filling out CYSF platform filling out the form: (Data & Acknowledgment)

Acknowledgment:

Ojas Patil

Vyankatesh Patil

Archana Patil

Data:

All the data I have saved.

Citations:

Links to different websites