

Magnets 磁鐵

Magnets and Maglev Trains

Have you ever seen magnets push away from each other or snap together? That's the same idea behind maglev trains! These special trains use powerful magnets to float above the tracks instead of rolling on wheels.

Magnets have two poles—a north and a south. When the same poles face each other, they push away, making the train lift up, or "levitate." Opposite poles pull together, helping keep the train steady. The train also moves forward because the track has electromagnets that can switch their poles. This pushes and pulls the train along without touching the track! Since there's almost no friction, maglev trains can go super fast and use about 30% less energy than normal trains.

Building Maglev Trains

After learning about magnets, students designed and built their own miniature maglev trains. They carefully measured and positioned magnets to make the trains float, testing different designs to see what worked best. This hands-on project helped them think like engineers—solving problems, testing ideas, and improving their designs!

磁鐵與磁浮列車

你有沒有見過磁鐵相互排斥或吸引在一起的情況？這與磁浮列車的原理是相同的！這些特殊的列車利用強大的磁鐵使列車浮在軌道上，而不像普通列車一樣依靠輪子滾動前進。

磁鐵有正反兩極 - 正極和負極。當同極靠近時，它們會相互排斥，這樣就會讓列車升起，或是「懸浮」；相反的兩極則會相互吸引，幫助列車保持穩定。相同的兩極也會使列車向前移動，因為軌道上有可以切換極性的電磁鐵，可以推動並拉動列車，不需要與軌道接觸！由於沒有摩擦，磁浮列車行駛得非常快速，且比普通列車少消耗約百分之三十的能量。

建造磁浮列車

在學習磁鐵的原理後，學生設計並製作自己的迷你磁浮列車。他們仔細測量並擺放磁鐵，使列車能夠懸浮，並測試不同的設計，看看哪一種效果最佳。這個實作專題幫助他們像工程師一樣思考 - 解決問題、測試想法，並改進設計！

1

ASK + IMAGINE
提問 + 創思

2

Students participated in hands-on activities to learn more about magnets.
學生參與實作活動來學習更多磁鐵相關知識。



5

IMPROVE
改進

Success! It took a lot of patience to test and improve our designs.
成功了！這需要很有耐心的測試和改進我們的設計。

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3

PLAN
計畫

We designed a train and track according to precise measurements.
我們根據精確的測量來設計火車和軌道。



4

CREATE
創造

During this stage, the train and track were constructed with magnets placed strategically for testing.

在這個階段，我們在火車和軌道中放了磁鐵來進行測試。

