Magnets & Magnetic Fields

The invisible pull that fills the space around a magnet

The Big Idea

*A **magnet** can move things without touching them — because the space all around it is filled with an invisible, real force called a **field**.*

The field is there even when nothing shows it. Sprinkle iron dust near a magnet and the field draws its own picture: curving lines that pour out of one end, sweep around, and dive back into the other end.

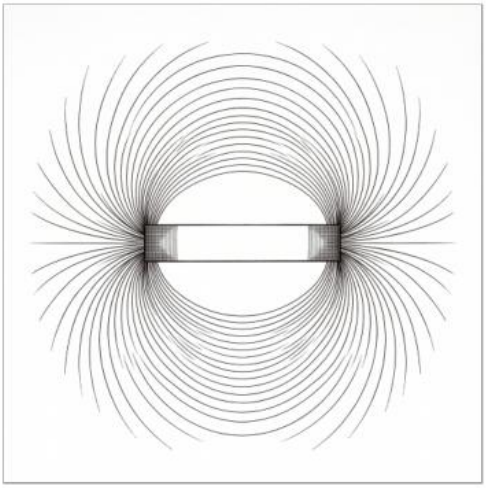


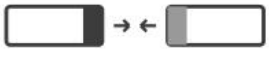
*Fig. 1 — the **field**: the invisible reach all around a magnet. Every line leaves one pole and curves home to the other.*

Magnets Are Picky

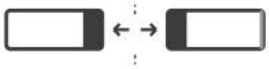
A magnet does **not** grab all metal. It ignores a penny, a soda can, and most jewelry. It grabs only **iron** — and **steel**, which is mostly iron. *If the magnet grabs it, there is iron inside.*

The Two Ends

Every magnet has two ends called **poles** — where the pull is strongest. The two ends are not the same:



*different ends **attract** — pull together*



*matching ends **repel** — push apart*

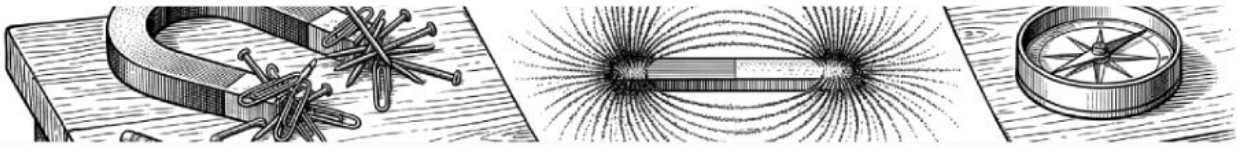
Words to Know

magnet · pole · iron · field · steel · attract · repel

magnet — a piece of metal with an invisible pull · pole — one of the two ends, where the pull is strongest · iron — the metal magnets grab · field — the invisible reach all around a magnet · attract — pull together · repel — push apart

Watch For This in Everyday Life

- Test the fridge magnets — *"what is really holding this up: the paper, or steel hiding under the paint?"*
- Hunt the kitchen for a metal the magnet ignores — *"the foil and the soda can are metal… so why won't it grab them?"*
- Find the hidden magnets in the house — cabinet latches, purse clasps, the knife strip — *"how did you know a magnet was in there?"*
- When a magnet works through a door or a tabletop — *"what is the pull passing through?"*



magnet

magnet

pole

pole

iron

iron

Magnets & Magnetic Fields

Magnetic or not? — predict, then test — front

WORKSHEET

1 · Guess first, test after

BEFORE any magnet is picked up: in the MY GUESS column, circle the little picture you believe — sticks, or doesn't. Then test each thing for real and circle what truly happened in the TEST column. No fair changing a guess!

THE THING	MY GUESS		THE TEST	
 *steel nail*	sticks	doesn't	sticks	doesn't
 *paper clip*	sticks	doesn't	sticks	doesn't
 *soda can (aluminum)*	sticks	doesn't	sticks	doesn't
 *penny (copper)*	sticks	doesn't	sticks	doesn't
 *shiny spoon*	sticks	doesn't	sticks	doesn't
 *wooden block*	sticks	doesn't	sticks	doesn't
 *plastic brick*	sticks	doesn't	sticks	doesn't
 *glass marble*	sticks	doesn't	sticks	doesn't

2 · Count your results

How many things did the magnet **grab**? ☐ How many did it **ignore**? ☐

3 · Think like a scientist

Look at everything the magnet grabbed. **What are all of those things made of?** Tell someone the magnet's secret.

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Draw the Invisible Field

You saw the iron dust make it appear — now draw it from memory

WORKSHEET

1 · Draw the field around this magnet

The iron dust showed you the field's secret shape. Draw the **curving lines** all around this magnet — remember: every line **leaves one end and curves back to the other end**. Then trace the word **pole** at each end.



draw the curving lines you saw — then add ONE thing the magnet is pulling in

2 · Where is the pull strongest?

Put a big ★ **star** at each place on your drawing where the iron dust piled up thickest. *Hint: there are two.*

3 · Think like a scientist

The field is still there right now, even with no iron dust to show it. Tell someone: **how do you know it's real if you can't see it?**

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The Invisible Pull

the lesson's song — sing it, then say what it means

SONG

Verse 1

There's a nail on the table and it's sitting there still,
Nothing's gonna move it — and nothing ever will...
Till the magnet comes a-sliding, gets closer and near —
And the nail jumps up like it suddenly could hear!

Chorus

It's the invisible pull, the invisible pull —
There's a *field* all around it and the empty air is full!
It reaches through your hand, through the water, through the wall,
But if you're not iron... it won't pull you at all.
(The invisible pull!)

Verse 2

Every magnet has two ends, and we call each end a *pole* —
That's where the pull is strongest, that's the engine of the whole.
Two magnets snap together, then you flip one — whoa!
They push away like strangers saying "no, no, no!"

(Chorus)

Verse 3

Sprinkle iron dust and give the tray a tap —
The field draws its picture like a secret map!
Loops out of one end, curving 'round the bend,
Every line comes home to the other end.

(Chorus ×2, second time stomp on "pull, pull")

Tag (spoken, kids): "Magnet... pole... iron... FIELD!"

How to use it. Play the recording once while everyone just listens. Play it again and join in on the chorus only — that is the part carrying the lesson. By the third time most children have the chorus. Then close the binder and ask what the words actually mean; a child who can sing it and explain it has the idea for good.