

WHERE'S NORTH AGAIN?

SUPPLIES

- > Magnets - a single standard ceramic magnet will do, but if you want to take it to the next level grab a bar magnet as well.
- > Two large steel needles or nails*
- > A few smaller steel needs or nails*
- > A string
- > An open top jar big wider than the large needle or nail.
- > Pencil or stick longer than the jar opening

OPTIONS, OPTIONS

Did you know you could magnetize steel? You might need to magnetize a screwdriver to help you hold a screw in place as you start the hole.

In this lab we're going to explore the same process, but to make a survival tool: a compass. So, if you ever find yourselves out in the woods wanting to know what direction north is, you can make this rough compass with just a magnet, piece of steel, and a string - all things you would likely have with you in your pack.

INSTRUCTIONS

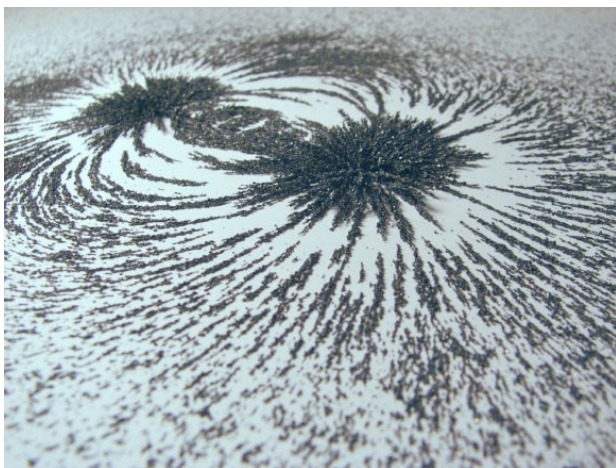
Take a large needle or nail and rub the magnet along the length 30 - 50 times. With each stroke, go the same direction, such as from your hand to the tip of the needle.

Test the magnetization of the large needle by using it to pick up a smaller needle. If it doesn't work, or work well enough to pull the small needle off the table, rub the magnet 30 - 50 more times and try again.

Tie one end of the string to the stick and the other end to the middle of the needle. Adjust the placement of the string on the needle so it hangs relatively level. Don't worry about perfection here - it's not needed to be perfectly level. Place the needle into the jar so that it hangs from the string and the stick rests on the rim like the image above.

The needle remove your magnet from the area so it doesn't interfere with the new magnet field of the needle. It points to magnetic north of Earth.

THE SCIENCE



The electrons in the inert steel travels in circles and in random directions around each atom. By rubbing them with a magnet, you realign the electrons to go all one direction, thus giving the steel it's own magnetism.

A stronger magnet will create a stronger field.

More strokes will create a better field.

You can learn more about this in our magnets lab found in the [Resource Library](#).

Image credit: Windell Oskay / CC BY 2.0.



MORE EXPERIMENTS

- > Try rubbing the second needle or nail in both directions.
- > Compare the north and south ends of bar magnet.
- > Try different metal items, such as alloyed nails.
- > Try different types of magnets.
- > Test the created field over time. How long does each last?
- > Test what you can pick up with your newly magnetized items.

USE THE SPACE BELOW TO PLAN YOUR NEXT EXPERIMENT!



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Why?

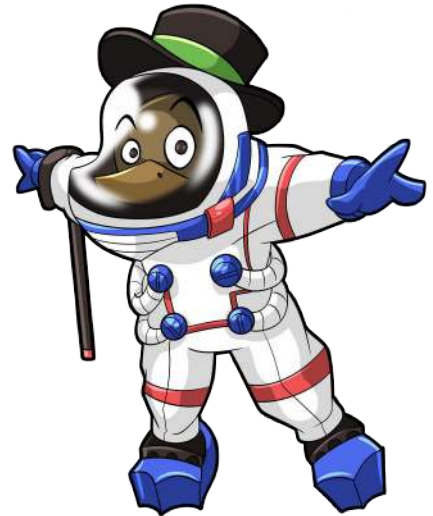
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Collaboration

We've built a lot of what we have off our needs and educators like you. We take requests to put on our to do list at any time. If you'd like to hire our graphic designers to make a packet for you, you can definitely higher them out, as well.

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