

MINI MAGNET WANDS

Explore magnets and magnetism

Curriculum topics

- Magnets and magnetism
- Properties of Magnetic Materials
- Geographic vs. Magnetic Poles

Subjects

- Physical Science
- Earth/Space Science

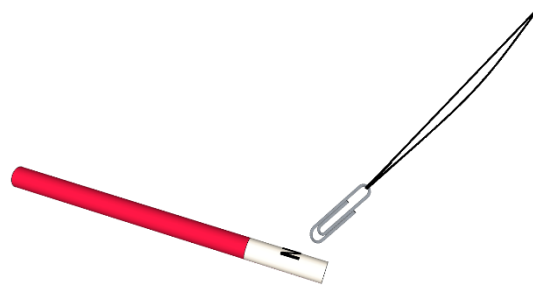
Grade range: 2 – 12

Serves: The 1-pack makes one magnetic wand while 10-packs make 10 individual magnetic wands.

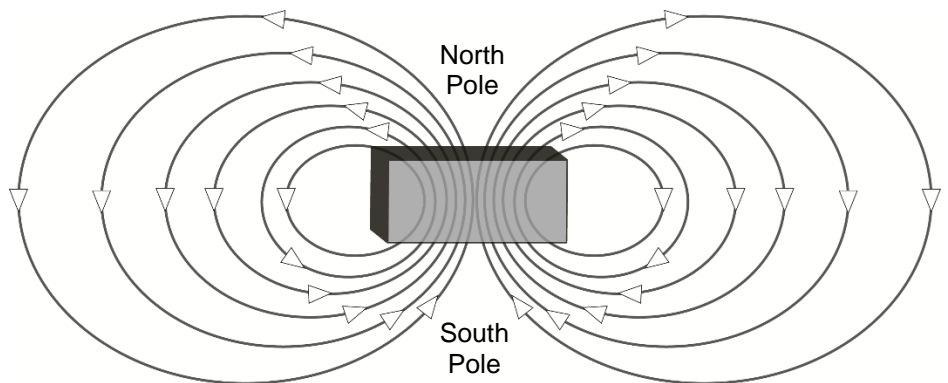
Who we are: Resource Area for Teaching (RAFT) helps educators transform the learning experience by inspiring joy through hands-on learning.

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Magnetism is a fascinating phenomenon for students. This simple yet effective activity provides a practical method for teaching students how to find and label the magnetic poles on a magnet, identify magnetic materials, and understand the difference between geographic and magnetic poles. Mini Magnet Wands can also be used to understand magnetic compasses.



Materials per Magnetic Wand

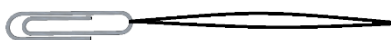
Materials in the kit may vary but generally, this kit contains the following:

- Plastic half-straw section, jumbo (x1)
- Mini bar magnet, ceramic (x1)
- Plastic coffee straw, round, narrow (x1)
- Thread, cut into 12" length (x1)
- Paperclip, magnetic, size #1 (x1)
- Adhesive label, pre-printed w/ "N" & "S" (x1)
- Coffee stirrer, wood, flat, narrow (x1)
- Optional: Directional compass (**not included**)

WARNING: Swallowed magnets can stick together across intestines causing serious infections and death. Seek immediate medical attention if swallowed or inhaled!

Finding the poles on the magnet

- 1 Insert thread through the paperclip and tie in a loop (below).

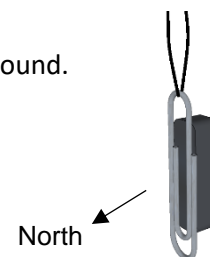
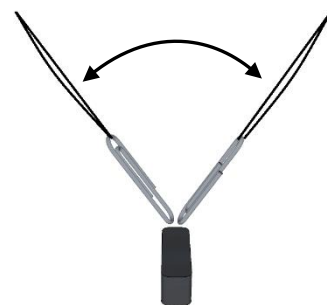


- 2 Hold the thread loop and move the paperclip over the magnet. Turn the magnet and repeat. The two sides that most strongly attract the paperclip are the **poles** of the magnet.

- 3 Put the paperclip flat against one of the poles. Suspend the magnet by holding the end of the thread loop. Let the magnet stop pivoting and face one direction. If the paperclip is facing north, it is on the **north** pole of the magnet. If not, the paperclip is on the magnet's **south** pole.

- 4 Put the paperclip on the north pole of the magnet. Hold the thread loop up again and move around. Does the north pole of the magnet always point north?

Paperclip attracted to pole from different angles



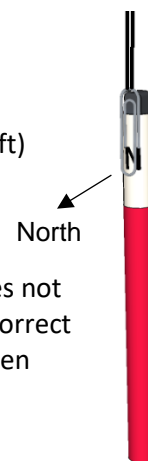
Set-Up

- 1 Wrap the adhesive label around the end of the jumbo straw. Carefully push the magnet **part way** into the jumbo straw (see below right). Make sure the magnet's north pole aligns with the N.



- 2 If the magnet fits loosely in the jumbo straw, use a section of the coffee straw as a wedge (above left)

- 3 Place the paperclip over the **N** on the jumbo straw (see right). Suspend the magnet by holding the thread loop and check that **N** faces north. If **N** faces north, then fully insert the magnet. If **N** does not face north, then use the wood coffee stirrer to push the magnet out of the jumbo straw. Align the correct pole with the **N** and reinsert the magnet part way. Suspend the magnet again, realign as needed, then fully insert the magnet into the jumbo straw.



Core Content Skills

Science & Engineering (NGSS)

Structure and Properties of Matter

Planning and Carrying Out Investigations

Analyzing and Interpreting Data

Asking Questions & Defining Problems

Types of Interactions

Magnetic Forces

To do and notice

- 1 Bring the **opposite** poles (**N-S** and **S-N**) and then the **like** (same) poles (**N-N** and **S-S**) near each other. Refer to the attracting and repelling forces being experienced. Note that each force increases as the distance between the magnets decreases.
- 2 Predict, and then test, which items from a group of magnetic and nonmagnetic items will or will not be attracted (not stick!) to a magnet.
- 3 Use the magnet wand to move, without touching, an item containing magnetic material.

The science behind the activity

We commonly label materials as being **non-magnetic**, **magnetic**, or a **magnet**. All matter really is magnetic, even if only at the atomic or sub-atomic level. Since most elements are only very weakly magnetic, we consider them to be non-magnetic. Iron, nickel, and many of the alloys made from them, such as the iron alloy we call steel, are magnetic.

Each magnet has areas called “poles,” with one being labeled the north pole and the other the south pole. These poles are usually on opposite sides/ends of the magnet. Like (same) poles (north/north or south/south) of two magnets will repel each other while the opposite poles (north/south and south/north) will attract each other. The attractive and repelling force increases as the magnets are closer together. The Earth’s North Pole is a geographic North Pole. Even though maps will list, correctly, a magnetic north pole in the North Polar Region the term “north” is a geographic designation. The Earth’s magnetic field has the equivalent of the south pole of a huge magnet in the area of the geographic North Pole and the north pole of the same magnet in South Polar Region. The north pole of a compass needle is thus being attracted to the south pole of the magnetic field of the Earth.

Reuse

This kit uses 100% reusable materials designed for other uses. To continue making a positive impact in reducing waste, reuse these materials in other projects. Any unused materials can be collected and delivered back to RAFT.

Feedback

Please comment on this kit by taking this short survey: <http://bit.ly/RAFTkitsurvey>. Let us know if any materials are missing, broken, or poorly fitting parts as well as suggest improvements.

Learn more

- Use the magnet wand to magnetize other objects

Resources

- YouTube video (8:06), Science of magnets - <https://bit.ly/2JfYua1>
- YouTube video (3:16), Earth’s magnetic field - <https://bit.ly/2JgNrNO>