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Science. Magnet's Magic for 2nd Graders!

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As we grow up we learn the fundamental rules of our world through exploration. Babies touch and taste everything and toddlers begin pushing and pulling objects to see what happens. One of these early fundamental rules is that objects don't move unless something pushes or pulls it. Then magnets come to blow children's minds. By sliding a magnet under a table paper clips and other metal pieces seem to move completely on their own! The invisible forces of magnetism capture students' attention and pull them in to want to learn more.

All objects carry the same properties as magnets. In fact all objects have magnetic forces. What separates traditional objects from what we would call a magnet is that the magnetic properties of certain minerals can be aligned to create a strong enough magnetic pull that we can notice it. For example an orange and a refrigerator magnet. The orange has magnetic properties but they are completely unorganized and facing in all different directions. This in effect negates any possible attraction. A refrigerator magnet, most likely made of a type of iron, has its magnetic poles all aligned and facing the same direction. This gives it the attraction properties we are familiar with. By aligning the magnet a distinct North and South pole are created within the magnet. The North and South pole create a magnetic field surrounding the magnet. Some objects can be influenced by this field and in turn become attracted to it. Paper clips are a common prop used with magnets because they are lightweight and traditionally made with steel. The elements that make up steel allow its own magnetic field to be aligned easily, making it highly attractive to magnets.

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The real magic in magnets comes when several magnets begin interacting with one another. Since all magnets create a North and South pole and a magnetic field bringing two magnets together doubles the magnetic potential. When the North and South pole of

two magnets is brought together they will snap together and hold firm. However when identical poles, for example North and North are brought together they will repel each other. As these two poles push away from each other, magnets will often jump off the table or flip over so their North and South can align. This can lead to some really cool experimentation and real world application. A simple trick with ring magnets is to identify the North and South poles and slide them on a pencil, the first magnet should have the North side up and the second the North side down. The magnets will repel each other and seem to float on the pencil. You can add five or six alternating ring magnets to a single pencil for a really cool effect.

Watch on YouTube

Our Earth has its own magnetic field. This field is created by the iron located at the Earth's core. We refer to the Earth's North pole to be magnetic North, and the South Pole as magnetic South. Our planet is basically one big magnet. The magnetic field of the Earth protects us from harmful magnetic radiation that bombards our planet from the sun. It can also create the phenomena known as Aurora. Magnetically charged particles blast off the sun in massive eruptions, they travel through space and then crash into our magnetic field. As the fields interact they release energy in the form of light, this causes the Aurora Borealis and the Aurora Australis, often referred to as the Northern and Southern lights. We use the power of Earth's magnetic field to find our way around. A compass has a sensitive piece of metal inside that is pulled toward the North pole of Earth. Explorers have been using compasses to navigate on land and sea as early as the first century.

Magnets are also used in practical machinery from your blender, to electric cars and even to hover trains! Electric motors, like those found in a blender, remote control car or

robotics kit use electromagnets. These magnets can have their North and South poles flipped by adding an electric current. As the current flips the magnets inside the motor repel other magnets and cause blender blades to spin, car tires to rotate or your robot's arm to reach up. If you really turn up the power magnets can be used to levitate trains. Magnets in the track and on the train repel each other causing the train to “float”. Magnetic Levitation, or Maglev trains can reach incredibly high speeds and be smooth to ride in since there is no physical contact with the track.

Magnetic fields are a fascinating part of our world and their invisibility makes them a wonder to behold for children. Exploring with magnets can teach children the importance of the scientific process. Let them explore around the house with a refrigerator magnet finding out what it sticks to. Then let them make summaries, “the magnet sticks to metal, but not wood”, and even predictions based on new objects. “Do you think that pencil will stick to the magnet?” Simple refrigerator magnets can provide hours of exploration around the home or classroom.