

MAGNETIZE ME



TEACHER GUIDE



PLANNING

Here's a suggested schedule for this kit! The activities are designed to be completed in order, but you can decide when to do them over time. Required times are estimated.

ACTIVITY INFORMATION	SECTION(S)	TIME REQUIRED	DAY/ LESSON
ACTIVITY 1: MOTOR ROLLER Combine magnets and a battery for a device that moves on its own. Time required: 45 min	<ul style="list-style-type: none"> Battery-Powered Wheels 	45 minutes	Day 1
ACTIVITY 2: IT'S ELECTRIFYING! Investigate the magnetic forces created by electrical energy. Time required: 2 h 15 min	<ul style="list-style-type: none"> Motoring Along 	45 minutes	Day 2
	<ul style="list-style-type: none"> All Wound Up 	90 minutes	Day 3
ACTIVITY 3: IT'S MAGNETIC! Learn about the mathematical relationship between voltage, current, and resistance. Time required: 3 h 30 min	<ul style="list-style-type: none"> Our Forces Combined 	60 minutes	Day 4
	<ul style="list-style-type: none"> Lost in a Field 	60 minutes	Day 5
	<ul style="list-style-type: none"> All Lined Up 	90 minutes	Day 6
ACTIVITY 4: SHOW ME THE WAY Discover how electromagnetic forces can be predicted. Time required: 2 h 30 min	<ul style="list-style-type: none"> Electron in a Wire 	60 minutes	Day 7
	<ul style="list-style-type: none"> Amps, Ohms, Volts, Oh My! 	90 minutes	Day 8
ACTIVITY 5: HOMEMADE MOTOR Build and test motor designs using the materials in this kit. Time required: 3 h	<ul style="list-style-type: none"> Spinning in Place 	120 minutes	Day 9
	<ul style="list-style-type: none"> Show What You Know 	60 minutes	Day 10
ACTIVITY 6: KEEP THE MOTOR RUNNING Use these fun extension ideas to increase their learning! Time required: 3+ h	<ul style="list-style-type: none"> Science Fair 	120 minutes	Day 11
	<ul style="list-style-type: none"> Meet an Engineer 	60 minutes	Day 12
	<ul style="list-style-type: none"> Physics Simulator 	60 minutes	Day 13

Total time: 15+ hours

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activity

KEEP THE MOTOR RUNNING

There are stronger forces to attract your student to science! Help your student decide which activities they would like to try to learn more about electromagnetic forces.

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SCIENCE FAIR

DIY PROJECT

- If your student is looking for science fair ideas, the electromagnet experiment from Activity 2 is a popular option.
- The student can use the model of designing their own experiment as with Activity 5.
- Work with them to make sure the presentation meets the qualifications and timeline for the science fair.
- Additional resources and materials are available on Home Science Tools website.
- You can also find helpful information about designing a successful science fair topic.

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MEET AN ENGINEER

RESEARCH

Is your student interested in studying more substances with the power of chromatography?

- Use extra filter paper or even coffee filters to run more experiments.
- Your student can try separating the pigments or dyes from pens, markers, paints, foods, and more.
- Coffee filter chromatography is especially useful for making chemistry art.

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PHYSICS SIMULATOR

TECHNOLOGY CONNECTION

Your student may enjoy making crystals from various water-soluble substances like table sugar, table salt, borax, and Epsom salt.

- Two methods for making crystals are provided, but encourage your student to design their own experiment.
- They should also consider the relationship between the shapes of crystals at the large scale and the small scale.
- Crystal-making is an interesting topic for science fairs because it involves experimental design, solubility, particle-level structures, and states of matter.

GLOSSARY

Compass – an instrument that contains a magnetic needle, showing the direction of magnetic north.

Circuit – a path through which electricity flows.

Conductivity – the property of a material which lets electricity flow through it.

Current – the rate at which electrical charge moves through a circuit.

Energy – ability to make something move or change.

Electrical energy – the energy of moving electrons.

Electron – a negatively charged part of an atom.

Electromagnet – an object that is not normally magnetic but becomes magnetic when electricity flows through it.

Electromagnetic force – the interaction between positive and negative charged particles that generates electrical and magnetic fields.

Lorentz force – the force exerted on a charged particle by an electric and magnetic field.

Magnetic field – the pattern of magnetic force around a magnet.

Magnetic force – the ability of a magnet to attract or repel.

Motor – a device that changes one type of energy, such as electricity, to the energy of motion.

Ohm's Law – the mathematical relationship between voltage, current, and resistance, showing that current is directly proportional to voltage and inversely proportional to resistance.

Point charge (q) – an electric charge that does not have a volume or size.

Resistance – a measurement of a material's opposition to the flow of electric current.

Solenoid – a coil of wire which carries electricity and acts like a magnet.

Voltage – the potential energy between two points in a circuit, causing electrons (electric charge) to move from one point to another.

Torque – the rotational force that produces a change in the rotational motion of an object.

SAMPLE

LAUNCH



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Instructions	IN-MAGNMET
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