# Lesson 1 - Magnetic Cars

**Teacher Directions for Magnetic Cars Activity**

This session’s engagement will start with students observing the properties and interactions of different types of magnets. Provide students with magnets of different sizes and shapes and allow them in investigate. If needed, you may provide students with books or short online videos explaining the forces and interactions of magnets.

After researching the magnets, students will watch the video: Watch the video: <https://www.youtube.com/watch?v=aIwbrZ4knpg> to show how magnets are being used in real world situations.

You will provide students with the challenge of using magnets in cars to prevent accidents. In their notebooks, have students design diagrams explaining how they will use magnets in cars. Be sure that students explain how the magnets forces will prevent cars from colliding. Allow students to work together to provide feedback to each other, followed by time to redesign. Students will then build and test their model cars. Provide students with a variety of toy cars, a narrow track (for example, you can line up books to create a track the width of the cars) and magnets. Students should observe and collect data during testing to determine which design best prevents accidents.

# Lesson 2 - Electricity

**Teacher Directions for Electricity Activity**

This lesson should be used after students have had some hand’s on experience with building circuits. Students will design and create a safety feature for a disabled individual (hearing or vision impaired) using circuits. The engagement will feature images of crosswalk lights, alarm clocks, and smoke detectors. Ask students, “How can we make people with hearing or vision disabilities aware of these situations?” Students will draw a diagram of their circuit prior to building the circuit. Be sure the students explain the transfer of energy in their circuit diagram, as well as how their design will help someone with a disability. Students will need various batteries, wires, lights and buzzers to build their designs.

# Lesson 3 - Electromagnets

**Teacher Directions for Electricity Activity**

In this session, students will be designing tests and collecting data to find out how to create the strongest electromagnet. Display the video of the electromagnet lifting scrap metal (<https://www.youtube.com/watch?v=rP2C6M7tDhM>). Provide students with time to discuss what they notice and what they wonder. Provide students with a variety of materials: different sized batteries, different gauge batteries, and a variety of nails. Students will test different electromagnets to see which material or variable makes the strongest magnet. This provides a great opportunity to discuss fair tests in an experiment. Students should find one variable they want to test and keep everything else the same. Students will collect data in bar graphs to see which version of the electromagnet lifts the most paper clips.

# Lesson 4 - Magnet Engineering

**Teacher Directions for Magnet Engineering**

This should take place at the end of your electricity/magnet unit. Students will watch a video sharing everyday uses of magnets that make life easier. After the video, give your students time to investigate the classroom for possible problems that could be solved through the use of magnets. Students may collaborate with one another during the process. Students will design possible solutions to their problem. Students will draw a detailed diagram explaining their design, with specific labels showing how the magnetic forces help solve the problem. If possible, students may build their design and demonstrate it for the class. Look for student understanding of the scientific ideas behind why their design would work.