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| **Lesson Title: NASCAR Challenge** |  |
| **Grade Level: First Grade** | **Quarter: 2** |
| **Standards:** **Science**S1P2. Students will demonstrate effects of magnets on other magnets and other objects.* a. Demonstrate how magnets attract and repel.
* b. Identify common objects that are attracted to a magnet.
* c. Identify objects and materials (air, water, wood, paper, your hand, etc.) that do not block magnetic force.

**Math**MGSE1.MD.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (Iteration) |
| **Lesson Essential Question:** **EQ: How can I design a car that can be moved by a magnet?**  | **Vocabulary:** attract, repel, magnets, common objects, magnetic force, materials |
| **Lesson Materials**scissorspopsicle sticks strawspaper clipsbrass fastenersspongemarshmallowsstring | candy mints (hole in the middle)rubber bandmasking tapestringgluemagnetsplastic bottles | **Lesson Assessment:** * Student Journal
* Teacher Observation
* car
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| **STEM Challenge Overview:**We have been learning all about magnets. You have learned about objects that attract to magnets, how magnets attract and repel, and you have learned about materials that do not block magnetic force. Today you will be given a design challenge that will test everything you have learned about magnets!  |
| **Teacher Background:**The students have been conducting many experiments to learn all about magnets. They have learned what magnets are attracted to and not attracted too. They have also learned about materials that can and cannot block magnetic force. Students should have enough experience and understanding of magnets prior to doing this challenge. This should be used as a final assessment about magnets.  |
| **INSTRUCTION** |
| 1. **Ask/Engage Day 1 (20 minutes)**
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| * Put on a helmet (bike, etc.) and a pair of sun glasses. Pretend you are starting the engine of your very own race car. Tell the students that you are going to rev your engine and have them make a vroom, vroom noise. Now tell the students that they are driving with you. Say words like, go forward, reverse, turn right, turn left. Step on the gas!
* After pretending to race tell students that they are going to becoming NASCAR drivers and car designers!
* Introduce the challenge.

Challenge: NASCAR has been looking for a new race car prototype. They would like you to inspire their new race car design. They have hired you to become part of their racing design team. You will need to design a car that you can race by using magnetic force. Your job is to create a car that can be pulled by the force of a magnet. You will need to use materials that do not block magnetic force to construct your car. Have fun and don’t race too fast!* After introducing challenge have students play with Hot Wheels or any toy car. Practice what it’s like to move a car with a magnet.
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| 1. **Imagine/Brainstorm (Day 2, 30-45 minutes)**
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| Introduce the constraints of the design plan. Define the criteria for success. The car must include: * 4 wheels
* 2 axles
* Objects that do not block magnetic force
* Objects that are attracted to a magnet
* **You cannot use magnets on your car design; the magnet must move your car.**

The design must:* Have 2 to 3 colors
* Picture and parts labeled

Ask each student to work independently to come up with 1-2 possible design solutions. Students should draw/label their designs*.*  |
| 1. **Plan/Design (Day 2 continued)**
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| * After completing their brainstorm, put students into teams or let them pick teams. Teams could be made by numbering students or based on if they want their car to be pushed or pulled. (Only 2 students per team for this challenge)
* Each student presents their ideas to their team. Be sure to help students pick a final design and encourage them to support each other’s design.
* Student teams collaborate to come up with final design plan.
* Students draw final design plan and make a list of needed supplies.
* Let students explore materials prior to creating or during their designing to help improve their plan.
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| 1. **Create / Test (Day 3-4, 30 minutes each day)**
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| * Show students all of the materials, remind them to be careful with the Lifesaver Wheels because they break easily.
* Student teams build their design according to their design plan.
* Students test their design plan and record data.
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| 1. **Evaluate/Improve –** and repeat Steps 1-5
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| * Students will show what they created in small or large groups. Have students test their design to see how far they could move their car with a magnet. Students can measure to see which car went the furthest by measuring with Unifix cubes, pieces of string that are each 1 foot, etc.
* Students evaluate their design for success. Did it meet the established criteria? Did their final design match their planned design? How would students improve their design?
* Be sure to provide students with extra time to complete their design if it needs to be improved. You may also let each student create their own after they each made a successful team car.
* **If student groups are successful let them build a second car so each student can take one home or display it in the classroom.**
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