Name _____ Date_____

Activity 5: Mapping Magnetic Fields

Guiding Question: How can we visualize a magnetic field?

Key Words: ***field***, ***field lines***, *force, force-at-a-distance,* ***gravitational field, magnetic field, magnetic force***

Get Started:

1. Read the introduction and Guiding Question to Activity 5, "Mapping Magnetic Fields," in your Student Book.

2. Do you think we are in a gravitational field right now? Are we in a magnetic field right now? What evidence do you have that fields exist?

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Do the Activity:

Part A: Field Around One Magnet

1. Complete the first part of Student Sheet 5.1, "Talking Drawing: Mapping Fields," which is attached to this packet.

2. Read Procedure Steps 1-13 in your Student Book.

3. *Watch the LABsent video (found here:* https://labaids.s3.us-east-2.amazonaws.com/labsent-videos/3-1+Fields+LABSent+5+Part+A.mp4*), to see the experiment being performed.*

Part B: Field Around Two Magnets

4. Read Procedure Steps 14-17 in your Student Book.

5. *Watch the LABsent video (found here:* https://labaids.s3.us-east-2.amazonaws.com/labsent-videos/3-1+Fields+LABsent+5+Part+B.mp4*), to see the experiment being performed.*

Procedure Step 17: Complete Student Sheet 5.1, which is attached to this packet, and revise your drawing of how you imagine a magnetic field.

Build Understanding:

1. Look in Appendix G in your Student Book and read the definition for the crosscutting concept of *cause and effect.* How do you think the crosscutting concept of *cause and effect* relates to this activity?

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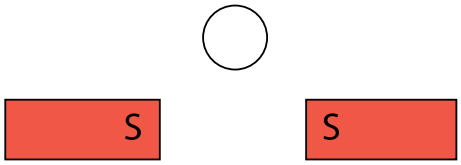
Analysis:

1. Imagine doing the same activity on a very big piece of paper. What would the field lines that went off the smaller page look like on the larger page?

2. Two bar magnets are placed on the table a few inches apart. Then a compass is placed near them, as shown in the following diagram. Draw an arrow on the compass that represents the direction the needle will point because of the magnetic field between the magnets. Explain what would cause the compass needle to point in that direction, using the terms *magnetic force* and *magnetic field.*



3. The goal of this investigation was to provide evidence that magnetic fields exist around magnetized objects. Did the data you collected support that goal? Explain.

4. Do the magnets in this activity have both a magnetic field and a gravitational field? Explain.

5. Two magnets with opposite poles facing each other are held close to each other but are not touching. When released, the magnets snap together. When this happens, what evidence is there that energy is being transferred?

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6. **Revisit the issue**: How could a magnetic field contribute to the design of the Moon transporter?

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STUDENT SHEET 5.1

TALKING DRAWING: MAPPING FIELDS

1. Close your eyes and think about the magnetic field between two magnets attracting and two magnets repelling. Now, open your eyes and draw two pictures of what you imagined.

2. You have completed the activity. Now draw two pictures of what you think a magnetic field looks like between two attracting magnets and two repelling magnets.

3. In the space below, explain what changed from your "before" picture to your "after" picture, and why you changed it.