

MOTION AND MATTER—*Investigation 1, Part 2*

Investigation 1, Part 2:
**Magnetic-
 Force
 Investigation**

Teacher
Notes

Complete Teacher Notes

*Investigation 1, Part 2***Focus Question**

We observed that magnets do not have to touch paper clips in order to make them move or hold them suspended in air.

Can we collect **data** in order to predict the distance at which two magnets will attract a paper clip?



➤ How is the magnetic field affected when more magnets are added?

Teacher
Notes

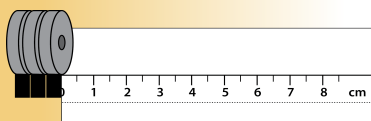
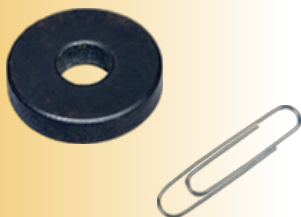
IG pg. 99, Steps 1–3

Investigation 1, Part 2

Force at a Distance

**Materials:**

6 doughnut magnets
2 paper clips

**Procedure:**

- Write the focus question in your notebook if you haven't already done so.
- Use the measurement ruler on the notebook sheet to find out how close to the magnet the paper clip needs to be to snap to the magnet. One person holds the magnet and the other moves the paper clip. Conduct three trials and record your results.
- Test the snap distance using three magnets. Skip two magnets for now. Record your data for three additional trials.
- Analyze your data. Look for a **pattern**. Predict the snap distance for two magnets.
- Test the snap distance using two magnets.
- Compare predictions to the data.
- Write an answer to the focus question.



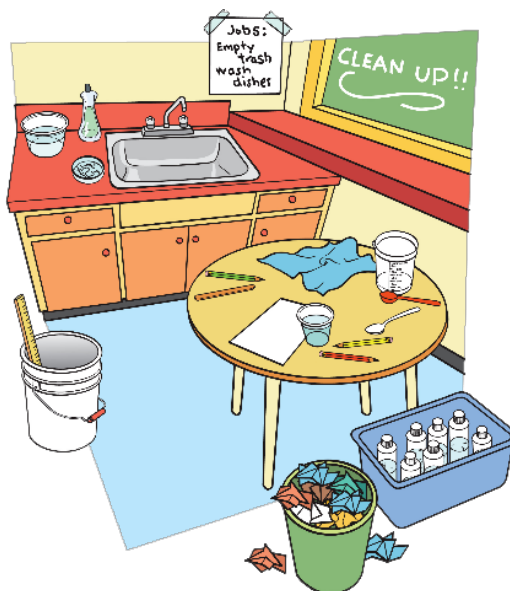
IG pg. 99–100, Steps 4–6

Investigation 1, Part 2

Clean Up!



Return the magnets and paper clips to the materials station.



IG pg. 100, Step 7

Investigation Results



Group Number	Snap Distance (1 Magnet)	Snap Distance (3 Magnets)	Snap Distance (2 Magnets - Prediction)	Snap Distance (2 Magnets - Actual)



IG pg. 101, Step 8

Vocabulary Review



IG pg. 101, Step 9

Focus Question

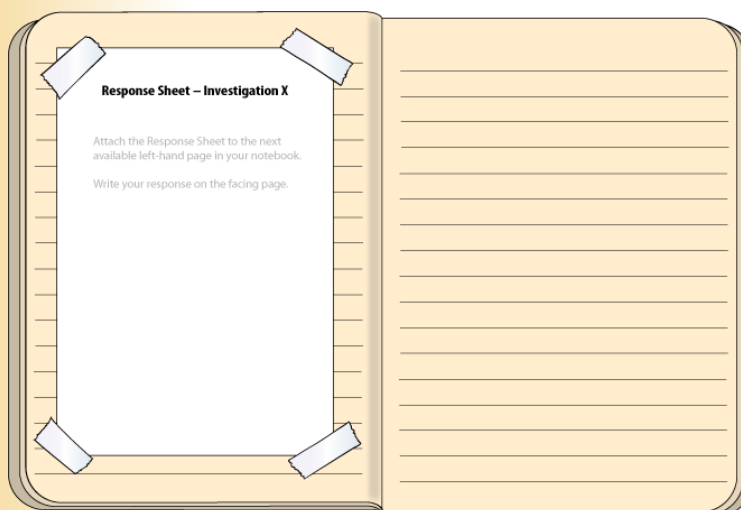


➤ How is the magnetic field affected when more magnets are added?



IG pg. 101, Step 10

Response Sheet



IG pg. 101, Step 11

Table of Contents

Investigation 1: Forces

Magnetism and Gravity	3
What Scientists Do	8
Change of Motion	10



IG pg. 102–103, Steps 12–13

Wrap-Up/Warm-Up

➤ How is the magnetic field affected when more magnets are added?

Pair up with a partner to

- share your answer to the focus question;
- describe the relationship between snap distance and the strength of attraction between the magnet and the paper clips;
- describe the relationship between the number of magnets used and the strength of the magnetic field.



IG pg. 103, Step 14

Investigation 1, Part 2

Motion and Matter

Developed at



**THE LAWRENCE
HALL OF SCIENCE**
UNIVERSITY OF CALIFORNIA, BERKELEY

Published and Distributed by



Delta Education

P.O. Box 3000
80 Northwest Boulevard
Nashua, NH 03063-4067
1-800-258-1302



**School Specialty
Science**

All rights reserved. Copyright The Regents of the University of California.

IMPORTANT: BY DOWNLOADING, INSTALLING, AND/OR USING THIS SOFTWARE ("SOFTWARE"), YOU AGREE TO ALL THE TERMS IN THIS AGREEMENT, AS WELL AS ANY AND ALL ACCOMPANYING DOCUMENTATION. IF YOU DO NOT AGREE, DO NOT DOWNLOAD, INSTALL, AND/OR USE THIS SOFTWARE.

The Regents of the University of California ("University") retains all rights in the Software. The University hereby grants the purchaser of this Software a limited, nonexclusive, nontransferable license to use the Software in accordance with the terms and conditions set forth herein. All materials contained herein are intended for classroom use only.

You hereby acknowledge that: (a) the Software may not be sublicensed or transferred to any third party; (b) you may not sell, distribute, rent or lease the Software to any third party; and (c) you will not make the Software available in any networked or time-sharing environment or transfer the Software to any computer or mobile device other than the single computer on which the Software is installed.



Teacher
Notes

FOSS Program Overview



MOTION AND MATTER—Investigation 1, Part 2

Investigation 1, Part 2:

Magnetic- Force Investigation



IWB Click the *Complete Teacher Notes Button* to open the complete Teacher Notes.

IWB Click the FOSS logo to access FOSSweb.



Teacher
Notes

Complete Teacher Notes



Focus Question



We observed that magnets do not have to touch paper clips in order to make them move or hold them suspended in air.

Can we collect **data** in order to prove that two magnets will attract a paper clip?



Motion and Matter, IG pg 99, Steps 1–3

Have students review Part 1, especially the floating paper clip investigation.

Discuss the next investigation as described in Step 2.

IWB Click the arrow to reveal the focus question.

Ask students to write the focus question in their notebooks.

New Word Introduce *data*.

data: information collected and recorded as a result of observation

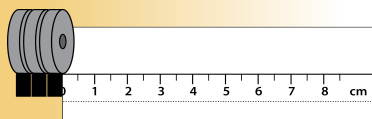
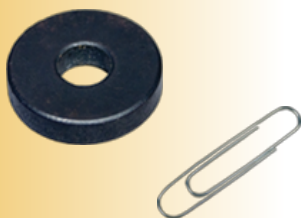
Add the new word to the word wall.

IG pg. 99, Steps 1–3

Force at a Distance



Materials:
6 doughnut magnets
2 paper clips



Procedure:

- Write your hypothesis.
- Use the materials to test your hypothesis.
- Sketch a diagram of your experiment.
- Record your data.
- Test your hypothesis.
- Conclude your investigation.
- Write your conclusion.

Motion and Matter, IG pg 99–100, Steps 4–6

Distribute notebook sheet 2, *Force at a Distance*, to each student.

Review the procedure for the investigation.

You can use teacher master 7, *Recording Data: Magnetic-Force Investigation*, to demonstrate the procedure. See Step 5 in Getting Ready for details about this demonstration.

IWB Click the *Notebook Button* to open notebook sheet 2 and teacher master 7.

Have groups get enough materials to work in pairs. (Meter tapes are optional.)

Assess scientific and engineering practices progress using the "What to Look For" in Step 6.

New Word Introduce *pattern*.

pattern: a consistent and repeating combination of qualities or behaviors

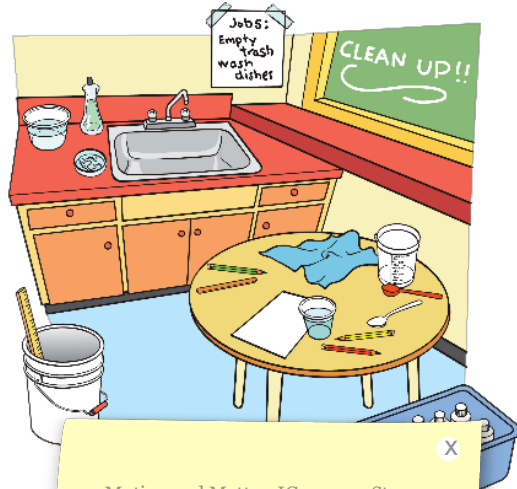
Add the new word to the word wall.



IG pg. 99–100, Steps 4–6

Clean Up!

Return the magnets and paper clips to the materials station.



Motion and Matter, IG pg 100, Step 7

Clean up.



IG pg. 100, Step 7

Investigation Results

Group Number	Snap Distance (1 Magnet)	Snap Distance (3 Magnets)	Snap Distance - (2 Magnets - Prediction)	Snap Distance (2 Magnets - Actual)

Motion and Matter, IG pg 101, Step 8

Have students record their pair's data on the chart. They can record an average snap distance for each magnet by recording all three trial results.

IWB: Students can use the *Pen Tool* to record their data.

Discuss the data and student thinking when they made their predictions.

Ask questions to highlight insights & clarify problems you noticed during performance assessment.

Motion and Matter, IG pg 101, Step 8

Have students record their pair's data on the chart. They can record an average of the snap distances for each magnet or record all three trial results.

IWB Students can use the *Pen Tool* to record their data.

Discuss the data and student thinking when they made their predictions.

Ask questions to highlight insights and clarify problems you noticed during the performance assessment.



IG pg. 101, Step 8

Vocabulary Review



Motion and Matter, IG pg 101, Step 9

Review vocabulary.

IWB You can use the *Pen Tool* to write class definitions beside the words or use this slide as a vocabulary resource/reminder.

IWB Click each word to reveal its definition at the top of the page.

These words should find a permanent place on a word wall in your classroom so that they are always accessible to students.



IG pg. 101, Step 9

Focus Question



➤ How is the magnetic field affected when more magnets are added?



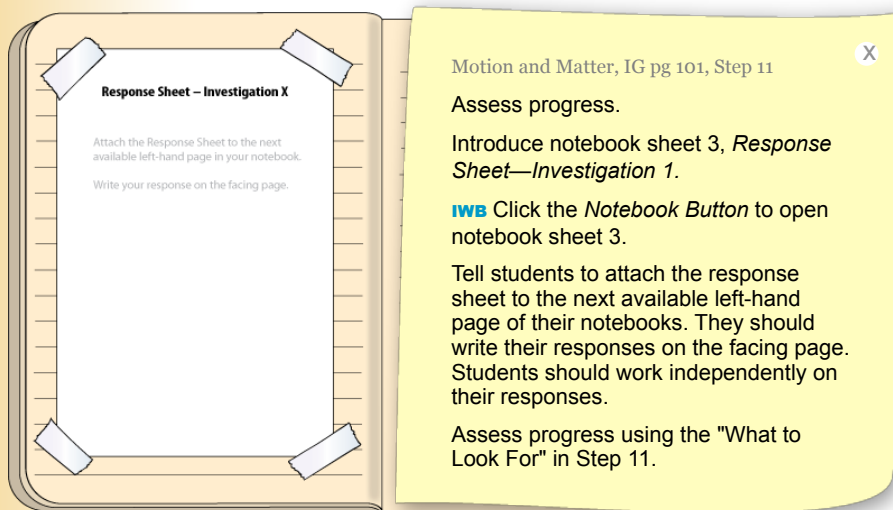
Motion and Matter, IG pg 101, Step 10

Ask students to answer the focus question in their notebooks if they haven't already done so.



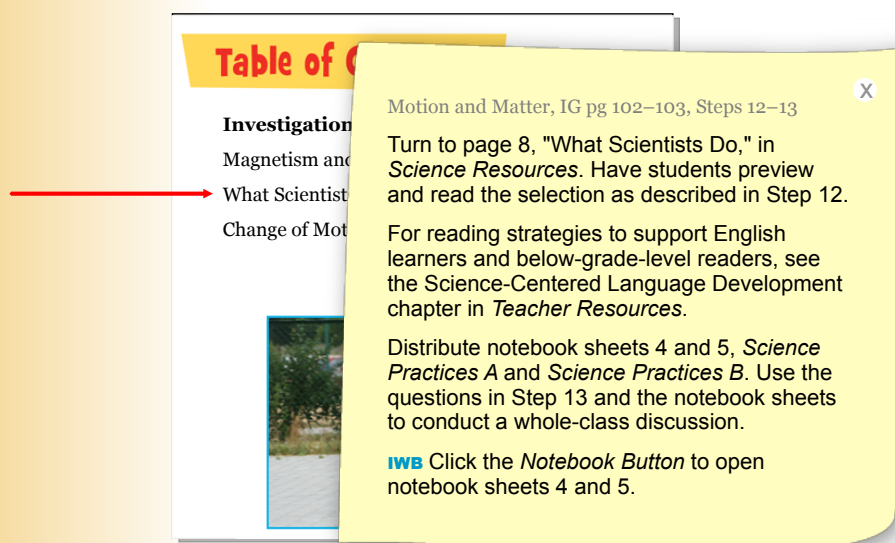
IG pg. 101, Step 10

Response Sheet



IG pg. 101, Step 11

Reading in Science Resources



IG pg. 102–103, Steps 12–13

Wrap-Up/Warm-Up



➤ How is the magnetic field affected when more magnets are added?

Pair up with a partner to

- share your answer to the focus question;
- describe the relationship between snap distance and the strength of attraction between the magnet and the paper clips;
- describe the relationship between number of magnets used and the strength of the magnetic field.



Motion and Matter, IG pg 103, Step 14

Wrap-Up/Warm-Up

Conclude this part or start the next part by having students share their notebook entries with a partner.

See the Science-Centered Language Development chapter in *Teacher Resources* for suggestions for how students can share responses.

See Step 14 for what to look for as you observe student discussions.

IG pg. 103, Step 14

Motion and Matter

Developed at



THE LAWRENCE
HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

Published and Distributed by



Delta Education

P.O. Box 3000
80 Northwest Boulevard
Nashua, NH 03063-4067
1-800-258-1302



School Specialty
Science

All rights reserved. Copyright The Regents of the University of California.

IMPORTANT: BY DOWNLOADING, INSTALLING, AND/OR USING THIS SOFTWARE ("SOFTWARE"), YOU AGREE TO ALL THE TERMS IN THIS AGREEMENT, AS WELL AS ANY AND ALL ACCOMPANYING DOCUMENTATION. IF YOU DO NOT AGREE, DO NOT DOWNLOAD, INSTALL, AND/OR USE THIS SOFTWARE.

Motion and Matter

IWB Click each logo to access its respective website.

IWB Click the *FOSS Program Overview Button* to open the FOSS Program Overview.



Teacher
Notes

FOSS Program Overview

