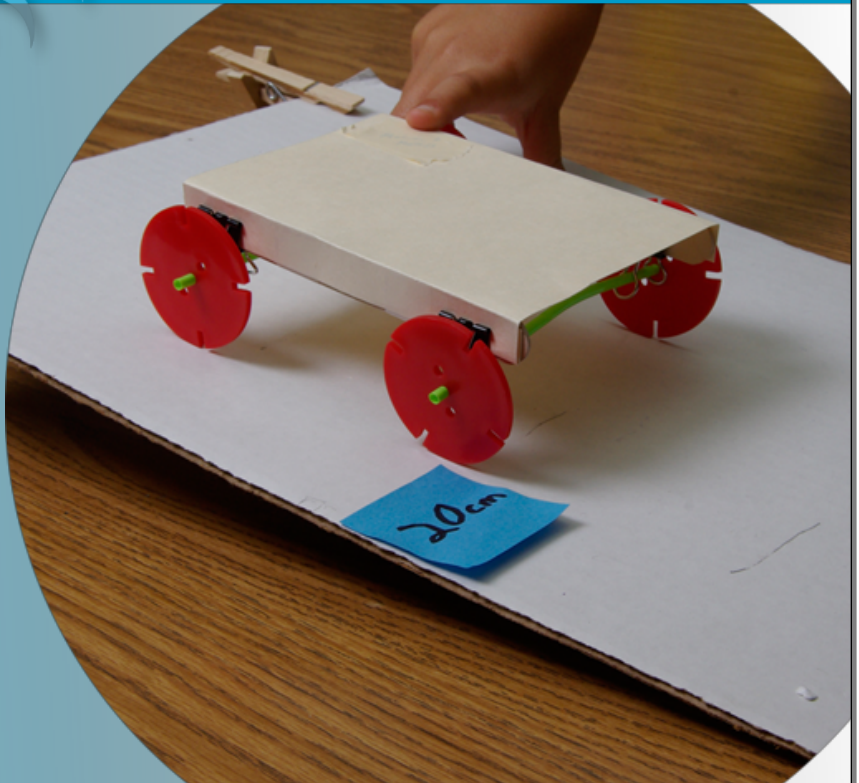


MOTION AND MATTER—*Investigation 3, Part 4*

Investigation 3, Part 4: **Cart Tricks**



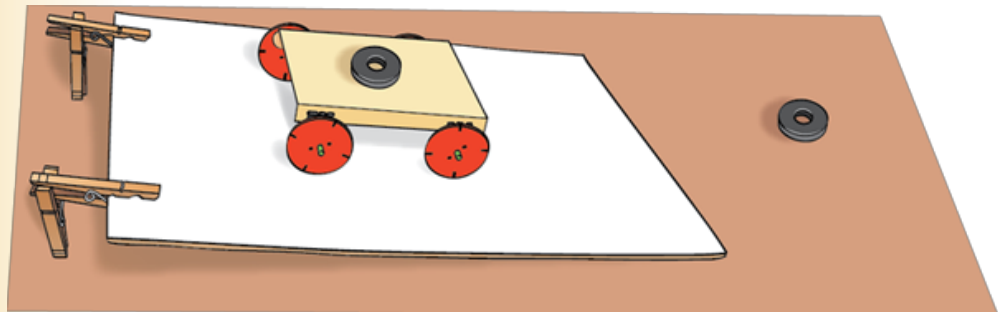
Teacher
Notes

Complete Teacher Notes



Focus Question

- How can you use magnets to do cart tricks?



Investigation 3, Part 4

Cart Tricks



You will be assigned one of three cart tricks as your challenge.

Trick 1: Pick up a magnet from the floor after the cart leaves the ramp and before it stops.

Trick 2: Use magnets to stop the cart before it reaches its natural stopping point.

Trick 3: Pick up ten paper clips from the floor after the cart leaves the ramp and before it stops.



Materials:

2 zip bags with carts and miscellaneous materials

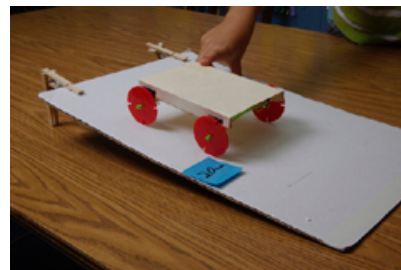
2 ramps

8 clothespins

8 magnets

- index cards

- paper clips



Criterion: You cannot touch or hold anything with any part of your body other than your hand to hold the cart at the top of the ramp when you are getting ready to let it go.

Time



Teacher
Notes

IG pg. 200–201, Steps 3–6

Investigation 3, Part 4

Design Your Own Trick



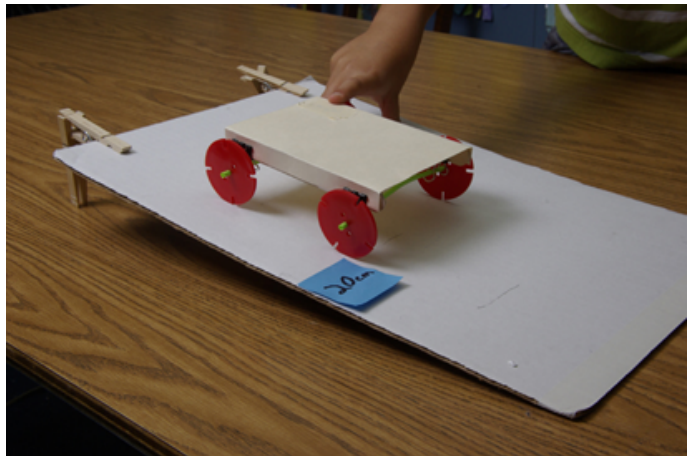
Design your own cart trick.

You may use any of the available materials.

Make sure you record your focus question and your designs in your notebooks.



Time



Teacher
Notes

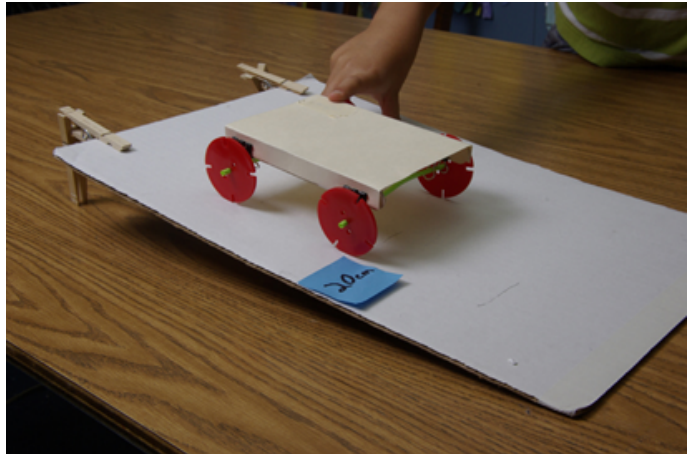
IG pg. 201, Steps 7–8

Investigation 3, Part 4

Focus Question



- How can you use magnets to do cart tricks?



IG pg. 201, Step 9

Investigation 3, Part 4

Clean Up!



- Return the materials to the materials station.
- Recycle cardboard or paper scraps.



Teacher
Notes

IG pg. 201, Step 10

Reading in Science Resources



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Investigation 3, Part 4

Investigation 3 Vocabulary Review



criterion
constraint
engineer
solution
bearing

standard unit
meter (m)
metric system
centimeter (cm)
start position



IG pg. 203, Step 13

Wrap-Up

- What are some important features of a cart that will roll from here to there?
- How can you improve the design of your cart?
- Your own focus question from the start-position investigation.
- How can you use magnets to do cart tricks?



Investigation 3, Part 4

Motion and Matter

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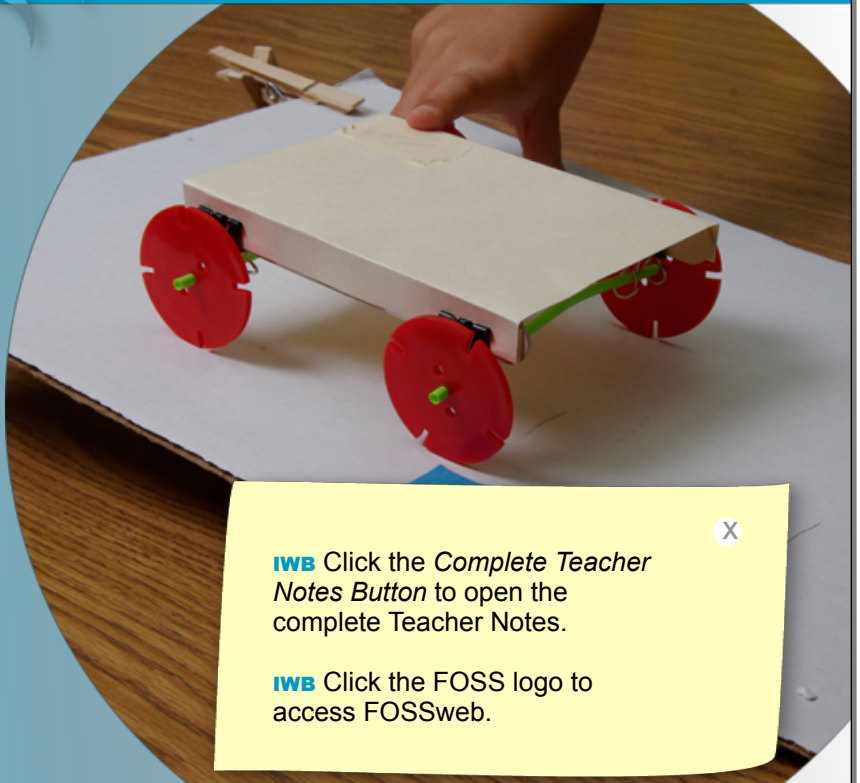
Teacher
Notes

FOSS Program Overview



MOTION AND MATTER—*Investigation 3, Part 4*

Investigation 3, Part 4: **Cart Tricks**



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

IWB Click the FOSS logo to access FOSSweb.



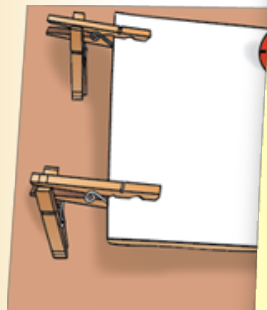
Teacher
Notes

Complete Teacher Notes



Focus Question

► How can you use magnets to do cart tricks?



Motion and Matter, IG pg 200, Steps 1–2

X

Tell students they will combine their knowledge of magnets and carts to do cart tricks. Each student will be assigned one of three tricks to do first. After that, they can design their own cart trick.

Ask students to write the focus question in their notebooks, or encourage them to write a specific question to match the trick they will be designing.



Teacher
Notes

IG pg. 200, Steps 1–2

Investigation 3, Part 4

Cart Tricks



You will be assigned one of three cart tricks as your challenge.

Trick 1: Pick up a magnet from the floor after the cart leaves the ramp and before it stops.

Trick 2: Use magnets to stop the cart before it reaches its natural stopping point.

Trick 3: Pick up ten paper clips from the ramp and before it stops.



Motion and Matter, IG pg 200–201, Steps 3–6



Describe the three cart tricks. Assign one-third of the class to complete each task.

IWB Click the arrow to show the materials needed and the criterion for the cart trick challenge.

Have groups pick up the materials and get started with their designs. They should draw diagrams and write a few sentences about their designs in their notebooks.

Have groups that worked on the same challenge meet, and present and demonstrate their designs to the other engineers.

IWB Use the *Pen Tool* to write when you want students to finish the activity.



Teacher
Notes

IG pg. 200–201, Steps 3–6

Investigation 3, Part 4

Design Your Own Trick



Design your own cart trick.

You may use any of the available materials.

Make sure you record your focus question and your designs in your notebooks.



Time

Motion and Matter, IG pg 201, Steps 7–8



Allow time for students to design and construct a cart trick of their choice. Provide them with extra materials they will need to construct their carts.

Allow time for each pair of students to show their cart tricks and answer a question or two from classmates.

IWB Use the *Pen Tool* to write when you want students to finish the activity.



Teacher
Notes

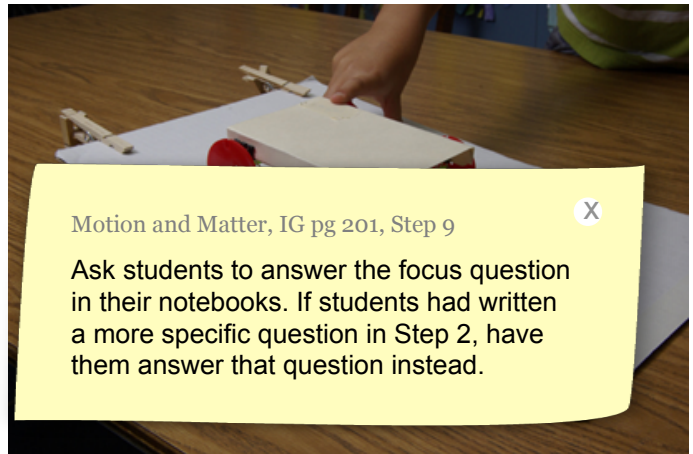
IG pg. 201, Steps 7–8

Investigation 3, Part 4

Focus Question



- How can you use magnets to do cart tricks?



Motion and Matter, IG pg 201, Step 9



Ask students to answer the focus question in their notebooks. If students had written a more specific question in Step 2, have them answer that question instead.



Teacher
Notes

IG pg. 201, Step 9

Investigation 3, Part 4

Clean Up!



- Return the materials to the materials station.
- Recycle cardboard or paper scraps.



Motion and Matter, IG pg 201, Step 10

Clean up.

X



Teacher
Notes

IG pg. 201, Step 10

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Motion and Matter, IG pg 202, Steps 11–12

Turn to page 42, "Magnets at Work," in *Science Resources*. Have students preview and read the selection as described in Step 11. Discuss the reading as described in Step 12.

For reading strategies to support English learners and below-grade-level readers, see the Science-Centered Language Development chapter in *Teacher Resources*.



IG pg. 202, Steps 11–12

Investigation 3, Part 4

Investigation 3 Vocabulary Review



criterion
constraint
engineer
solution
bearing

standard unit
meter (m)
metric system
centimeter (cm)
start position

Motion and Matter, IG pg 203, Step 13



Review vocabulary.

Take a few minutes to review the key words developed throughout Investigation 3.

Choose a few words that students are still learning and have them use the Frayer model to record the word, the definition, characteristics, examples, and nonexamples in their notebooks. See an example of the model in Step 13.



IG pg. 203, Step 13

Wrap-Up



- What are some important features of a cart that will roll from here to there?
- How can you improve the design of your cart?
- Your own focus start-position in
- How can you u tricks?



Motion and Matter, IG pg 203–204, Steps 14–15



Conclude this Investigation by having students discuss the new words and focus questions in their groups.

Remind students that in Part 3, they designed their own focus question for Investigating Start Position.

See Step 12 for the ideas that should come forward.

Administer the I-Check.

See the Interdisciplinary Extensions following Investigation 3 for suggestions to extend learning across the curriculum.



Investigation 3, Part 4

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