

Magnetic Racetrack



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Text Type: Non-fiction: Procedure — Experiment

Summary: In this procedural activity, students have the opportunity to explore the properties of magnets as they create a racetrack and a racing car.

PDFs and Audio
 Available Online
www.lpey.ca
 Password: mt3g3r

See the Planning Charts in the Grade Three *Reading Guide* to find Guided Reading texts that use these comprehension focuses.

Text Features

- ▶ steps/headings
- ▶ sidebars/glossary
- ▶ bulleted lists
- ▶ numbered list
- ▶ insert

Visual Literacy

- ▶ photographs
- ▶ chart
- ▶ car template

Print Concepts

- ▶ question marks
- ▶ bold print
- ▶ print arrangement

First Reading (pages 1-4)

Reading Strategies

Comprehension

- ▶ sequencing
- ▶ making connections: text to self

Working with Words

- ▶ extend vocabulary knowledge by incorporating information found in the glossary with information from the text

Assessment Opportunities

Note each student's ability to:

- ▶ sequence: follow the steps in the activity
- ▶ make text-to-self connections
- ▶ recognize which objects will attract or repel
- ▶ extend vocabulary knowledge through the glossary/sidebar and information in the text

Oral Language Opportunities

- ▶ brainstorming and sharing ideas in groups
- ▶ participating in discussion
- ▶ reiterating steps required to test magnetic properties



BEFORE READING

Making connections: text to self

Activating and Building Prior Knowledge

Show students examples of a bar magnet, a horseshoe magnet, and a fridge magnet. (A fridge magnet uses a “craft” magnet.)

Use the “give one, get one” strategy to solicit facts about magnets. Give each student a strip of paper numbered 1–5. Direct students to quickly jot the facts they know about magnets in two minutes. In groups of three, students share their lists. Students may add new information to their list during this time.

Gather the class together. Ask a few students to share new information.

Language predictability

It’s important that students have some understanding of the properties of magnets prior to completing the experiment. Make sure you use the terms *attract* and *repel* during discussion. If students have limited experience with magnets and their properties, you may also need to spend some time demonstrating the polarization of magnets.

Print concepts/language predictability

Direct students’ attention to the sidebars. Ask, *What do you think those little checkered flags signal?* Lead them to recognize that the ovals beneath the checkered flags provide definitions for the boldface words in the text. Suggest to students that they look first at the boldfaced words to see if they know them. If they don’t, they can look at the definition before you begin reading the text. This way, they will be prepared and there should be no need to interrupt the reading to make sure these terms are understood.

ESL Note: Although some terminology may be unfamiliar to ESL students, this is such a tactile and enjoyable activity that students should have little difficulty with the vocabulary. Allow plenty of opportunity for students to play with the magnets and get a “feel” for the meanings of the words *attract* and *repel*.

Sequencing

Setting a Purpose

Say, *Today, we’re going to find out how to make a magnetic racetrack and racing cars. To have this race, we need to do an experiment to investigate which materials are attracted to magnets. Let’s read to find out the steps required to do that.*

Teaching Tip: Write the purpose for reading on chart paper or a board so it is visible to all students in the group. This will help them focus as they read and encourage independence when they finish reading.



DURING READING

Visual literacy

Show page 1 and read the title, then the author’s and the photographer’s names. Have students examine the photograph and ask if they

**Print concepts/
language predictability**

Visual literacy/infering

Building confidence

see anything unusual about it. Lead them to note the position of the students' hands (under the track).

Show page 2. Read the heading. Ask, *Why do you think you have to start by asking a question?* Lead students to see that this is how scientists work. It's very difficult for people to learn anything unless they start by asking questions.

Read the text. After reading each page, note the sidebars again and tell students that these are similar to a glossary in which the author provides definitions for words she feels are essential for our understanding. Discuss with students objects that they think will attract or repel. Encourage students to make a chart of possible materials to use.

Show page 3. Read the heading. Ask, *Why do you think it might be important to make a guess before you go ahead with an experiment?* (A guess can help you focus on specific things you can test. Otherwise, you might waste a lot of time.) Read the sidebars and note the illustrations on the bottom of the page. Ask students what they think is happening in the illustrations. Then read the text.

Show page 4. Point out the chart, the illustrations, and the inset. Ask, *Are there any other materials you think you'd like to test? Can anyone tell me some kinds of materials that might be good to test? What kinds do you think would waste our time if we tried them because they are just not magnetic?* (Students may be able to tell you that if an item isn't made of some kind of metal, it won't be attracted or repelled by the magnet.) Finish by reading the text.

Invite students to join in with your reading at any time.



AFTER READING

Sequencing

Refer to the purpose for reading and ask, *What are the steps we need to follow to do this activity?* Encourage students to add to the chart any other items they might have thought of. Gather the materials needed to conduct the experiments.

Teaching Tip: It's a good idea to model how you wish students to complete the recording of information.

Copy reproducible pages 3 and 4 for students to refer to as they complete the experiment.

Teaching Tip: Decide whether you wish to have everyone do the experiment at one time or set up the experiment at a science centre and send students in small groups to conduct the experiment.

Second Reading (pages 5-6)

Reading Strategies

Comprehension

- ▶ sequencing
- ▶ analyzing

Working with Words

- ▶ understanding and using scientific terms

Assessment Opportunities

Note each student's ability to:

- ▶ sequence: follow the directions to make a racetrack
- ▶ analyze information
- ▶ read numbered/bulleted lists
- ▶ use scientific terms
- ▶ use the illustrations to increase their understanding of the text

Oral Language Opportunities

- ▶ discussing experimental results
- ▶ discussing possible racetrack designs



BEFORE READING

Analyzing

Activating and Building Prior Knowledge

Refer to the question posed on page 4. Ask, *What do you think would be the best thing to glue on to the race car to make the magnet pull it?*

Discuss the results from the test activity by having students refer to the data they recorded in their charts. Reflect on the discussion about what kinds of things would be good to test and what kinds wouldn't. Ask, *Can you add anything to that discussion? Did your findings during the testing support your ideas about what types of materials would or would not attract or repel a magnet?* Based on their experiment and findings, have students choose the item they wish to glue to their racing cars.

Sequencing

Setting a Purpose

Say, *Let's read to find out the steps we need to follow to make the race track.*



DURING READING

Building confidence

Show page 5. Read the heading. Read the text together. You may wish to draw attention to the photo and ask students what is happening in it.

Visual literacy/ text features

Show page 6. Read the heading. Explain the term *method* as a scientific term for the "How to" section. Ask, *If I didn't understand what the words said, what could I do?* Lead students to recognize how the photographs support the steps. Read the numbered list with students.



AFTER READING

Sequencing

Review the steps needed to make the racetrack by asking students, *To make the racetrack, what should I do first? Then what? What's the next step?* Jot the steps on the board as students say them. If they get one out of order, ask if everyone agrees that is the next step. Ask if it's necessary to make the racing car first or if that could be done after the track has been constructed. (It can!)

Gather the materials needed to build the racing cars and tracks.

Copy reproducible pages 6 and 8. Organize students in pairs. Discuss page 8 with students, ensuring that they understand the instructions. Ask, *Why do the instructions suggest that you colour the car first? Is that a good idea?* Provide time for partners to discuss the design of their racetrack. You may wish to set up a centre for students to visit to complete their racetrack/racing cars.

ESL Note: Ensure that ESL students are in situations where they can see other students making their cars. It shouldn't be a difficult task for them, and a little help from a friend should be all they require.

Language predictability

Set up a "Race Day." Partners can race against each other and other teams. Take the opportunity to photograph the partners and the experiments.

Make a list of the scientific words from the story, e.g., *purpose, experiment, materials, poles, attract, repel, method, magnetic*. Write the words in alphabetical order on a chart. Have students provide a definition for each word. Post this chart at the science centre and add to it other scientific terms as they are encountered.

Third Reading (page 7)

Reading Strategies

Comprehension

- ▶ evaluating
- ▶ analyzing

Working with Words

- ▶ recognizing and selecting scientific terms to add to dictionary

Assessment Opportunities

Note each student's ability to:

- ▶ evaluate materials in terms of their properties
- ▶ recognize and select scientific terms
- ▶ offer and back up opinions

Oral Language Opportunities

- ▶ discussing materials and results with partners, group, and class



BEFORE READING

Evaluating/analyzing

Activating and Building Prior Knowledge

Prepare a chart with the headings, “Partners,” “Winner,” and “Material.” Record the results of Race Day. Use the information on the chart to answer the questions from page 6.

Ask, *Whose car went the fastest? Which object(s) made the toy cars move the best?*

Evaluating

Setting a Purpose

Say, *After completing an experiment, scientists discuss their results and think about why those results happened. Let’s read some questions that will help us evaluate our results.*



DURING READING

Evaluating/self-monitoring

Read the heading on page 7. Read and discuss each question individually.

Draw attention to the insert as another possible experiment.



AFTER READING

Evaluating

Review the results and conclusions. Ask students how they feel the item they glued to the racing car worked. Did other students glue a different item to their racing cars? How did that work? Do students have any ideas about how the car or the track might be improved?

Self-monitoring

Give students an opportunity to make a change to their car/racetrack to improve their results or to find out something new.

Language predictability

Discuss the words *results* and *conclusion*. Ask, *What do you think the difference is between the meanings of those two words? (Results are what they observed—a summary of their observations. Conclusions are the explanations of those results.)* Add these words to the chart of scientific terms.

ESL Note: Write vocabulary from the activity on word cards and encourage students to use the words in sentences.



FURTHER READINGS

Many texts benefit from being reread with students. The three readings suggested in this plan can be expanded to include further readings. Participation will increase when text material becomes familiar and students become more comfortable taking turns.

For each rereading, we recommend that you select a balance of Print Concepts, Comprehension, and Working with Words strategies from the following suggestions. Make your selections based on the needs of your students.

Text features	<p>Print Concepts, Book Handling, and Text Features</p> <p>Make a chart of the headings used in this experiment: “Ask a Question,” “Make a Guess,” “What You Need,” “Method,” “Results and Conclusions.” This chart can be referred to when completing other experiments.</p>
Sequencing	<p>Focus on Comprehension</p> <p>Have students prepare a procedure for younger students to use to hold a race with plastic cars on a straight track. Ask, <i>What should you do to make sure the race is fair?</i></p>
Synthesizing	<p>Have students work in groups to discuss any problems they had while doing the activity. Have them talk about solutions and how they worked, then have them make a two-column chart with the problem in one column and the solution in the other. The work of each group can be stapled together to form a Troubleshooting Manual.</p>
Word solving and building	<p>Working with Words</p> <p>Write a sentence containing the word <i>magnet</i>. Write a second sentence containing <i>magnetic</i>. Discuss the part of speech represented by these words. Use other examples. Have students identify the part of speech.</p>



RESOURCE LINKS

You may wish to do some of these optional follow-up activities. Choose those that best meet the needs and interests of your students.

Writing

Invite students to write an account of Race Day at School to be included along with photos in the school/classroom newsletter. See the Procedural text-type writing study for writing an experiment in the *Writing Guide*.

Independent Reading

Make *Magnetic Racetrack* and the online audio available for students. Invite students to use these materials to read the book independently.

There is a reproducible form of the text for students. Place other texts about magnets at the reading centre.

Teaching Tip: The online audio for this book includes a fluent reading of the text.

Working with Words

Once concepts have been introduced in context, see the focused lessons in the *Working with Words Guide* for more direct instruction for those students who need it.

See also the specific Building Words lessons (“Buildings” and “Magnetic”) under Word Solving and Building in the *Working with Words Guide*.



Home Links

Students can duplicate this experiment at home with family members. Send copies of page 8 home for other family members to make cars for the race.

Give each student a craft magnet to use in their quest to find magnetic items at home. Provide opportunities for students to share their findings with their classmates.

Read Aloud

Read aloud a book that relates to this experiment in some way. You might for instance read:

- ▶ *Magnets: Mind-boggling Experiments You Can Turn Into Science Fair Projects* by Janice VanCleave
- ▶ *The Science of Electricity and Magnetism: Projects and Experiments with Electricity and Magnets* by Steve Parker

These will provide an opportunity to talk about other experiments with magnets that students can conduct easily at home.

Whenever possible, make text-to-text connections between the new material being read and *Magnetic Racetrack*.