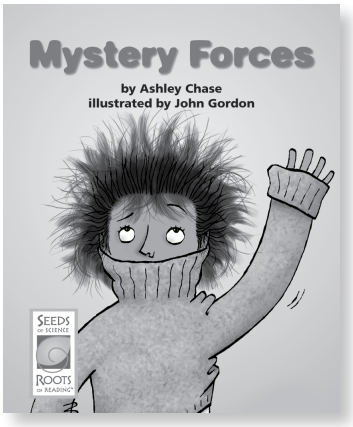
Strategy Guide

Teaching Concept Mapping

with *Mystery Forces* from *Seeds of Science/Roots of Reading*®



Introduction

This strategy guide introduces an approach for teaching concept mapping to help students understand information presented in content-area texts. Concept mapping supports students in making connections between known information and new information. By creating concept maps, students clarify their understanding of the topic and integrate new ideas into their thinking. This guide includes an introductory section about teaching concept mapping, a general overview of how to teach this strategy with many science texts, and a plan for teaching concept mapping with the *Seeds of Science/Roots of Reading*® book, *Mystery Forces*.

Book Summary

A train floats in the air. A tree shrinks instead of growing. A spoon seems to move by itself. What's going on? Students grapple with these "mysteries" as they read *Mystery Forces*. In this book, readers are provided with six mysterious scenarios and are asked to figure out which of three forces is involved: gravity, magnetic force, or electrostatic force. Using descriptions of different pulls or pushes, readers deduce that gravity pulls the apples on a tree branch toward Earth and causes a car to roll downhill; magnetic force is used to operate a compass and a high-speed train and to move a spoon; and electrostatic force causes socks to stick together. By thinking carefully about the effects of each force, readers are able to make explanations and solve the mysteries.

About This Book

Reading Level

Guided Reading Level*: L

Text Features

book description, table of contents, glossary, headings, about the author, bold print, italic print, diagrams, illustrations

*Guided Reading Levels based on the text characteristics from Fountas and Pinnell, *Matching Books to Readers.*

Science Background

A force is a push or a pull between two objects. Forces exerted by objects can be placed into two broad categories: those that require contact between objects, and those that can act at a distance. One way to visualize the forces between objects that do not touch is to think about their fields. A field is the direction and strength of force that an object exerts. There are three different nontouching forces discussed in *Mystery Forces*: gravity, magnetic force, and electrostatic force. Gravity is the attractive force between all objects that have mass. Earth's gravity is the most noticeable. Although all objects exert the pull of gravity on each other, we only notice the gravity of Earth because Earth is far more massive than any other objects nearby. Magnetic force is exerted by materials with magnetic poles. Magnets attract or repel other magnets and attract certain metals such as iron. Earth behaves like a giant magnet, which is what allows a compass to work. Electrostatic force is often, somewhat incorrectly, called static electricity. Electrostatic force is the force exerted by charged objects. Electrostatic force can cause objects to attract (when socks cling together in the dryer) or repel (when your hair stands on end after being rubbed with a balloon).

About Concept Mapping

Concept maps are a visual way to represent relationships among ideas. Concept mapping helps students integrate new ideas with their existing knowledge. Teaching concept mapping affords students a process for organizing the information they learn from reading. Concept maps aid students in summarizing texts and identifying main ideas. They can also provide teachers with a useful way of assessing students' understanding of a topic. The concept map featured in this guide has a main topic at the top and three subtopics below it, but there are many possible ways to organize concept maps. (For examples of various concept maps, visit the *Seeds*/*Roots* Web site at www.seedsofscience.org/strategyguides.html)

Teaching Concept Mapping

The following guidelines can be used to teach concept mapping with any content-rich book.

- Select a text that includes concepts related to your curriculum. Choose a text (or portion of a text) that has a clearly focused topic with a few subtopics.
- Develop the concept map that you will use with students. Based on the text you have selected, sketch a concept map that represents the relationships among the ideas in the text. Make sure that there is one main topic with related subtopics connected to it. (You can use the Concept Map copymaster included with this guide or create your own.) Fill in notes about relevant information from the text on this planning copy of the concept map. You will use this as a reference during class.
- Model concept mapping for your class. Draw a large, blank version of the concept map on the board or on a piece of chart paper. Explain that a concept map can help students organize information they learn from reading. Write the main topic on the concept map and tell students that this is the main idea to which they should pay attention as they read.
- Identify ideas that relate to the main topic. During reading, you can stop periodically to discuss ideas as a class, or you can ask students to flag important ideas in the text using sticky notes.
- Organize important concepts. Have students share relevant ideas they identified during reading. Record these ideas on the concept map using single words or short phrases. Organize related ideas by placing them around the main topic or branching off of the ideas previously listed. Explain why you are organizing certain ideas with related ideas. You might also ask students to suggest where you should write their responses and ask them to explain their reasoning.
- To extend the activity, construct a paragraph with students. Invite them to help you organize ideas based on what you included in the concept map. Model turning the main topic on the map into a main idea sentence. Ask students to help you transform notes about the subtopics into sentences that support the main idea.
- Continue to use concept mapping as a way to organize information. When students read other content-rich books, construct class concept maps that show how the ideas are related. As students become more familiar with concept maps, ask them to construct their own. This will help them synthesize important ideas from what they have read. Concept maps can also be used for other purposes, such as organizing ideas for writing or reviewing key ideas from a unit of study.

Teaching Concept Mapping with *Mystery Forces*

Getting Ready

1. On the Concept Map copymaster, fill in the information shown in black type in the boxes in the model on the following page. Then, make a copy for each student.
2. Draw a large version of the concept map on the board or on a piece of chart paper. Fill in the same information as you did on the copymaster. For your reference, suggested student responses are shown in green in the model.

Before Reading

1. Tell students that *Mystery Forces* is about forces between objects that do not touch. Activate prior knowledge by asking students to share what they already know about forces.

2. Tell students that the picture you drew on the board is called a concept map. Explain that completing the map will help them organize the important ideas they will learn from reading.

3. Point out that you have written "Mystery Forces" in the top box because this is the topic that the whole book is about. Let students know they will complete the map and fill in the details after they have had a chance to read the book through once.

During Reading

Read *Mystery Forces* in a way that is consistent with your classroom routines, giving students as much independence as possible.

After Reading

1. Distribute a Concept Map student sheet to each student. Tell students that, as a class, you will revisit the book, gather important information, and add important ideas to the concept map.

2. Point out to students that the concept map has three subtopics that represent the three different forces introduced in the book. Explain that for each kind of force, the class will find information that answers the questions "What is it?" and "What are some examples?"

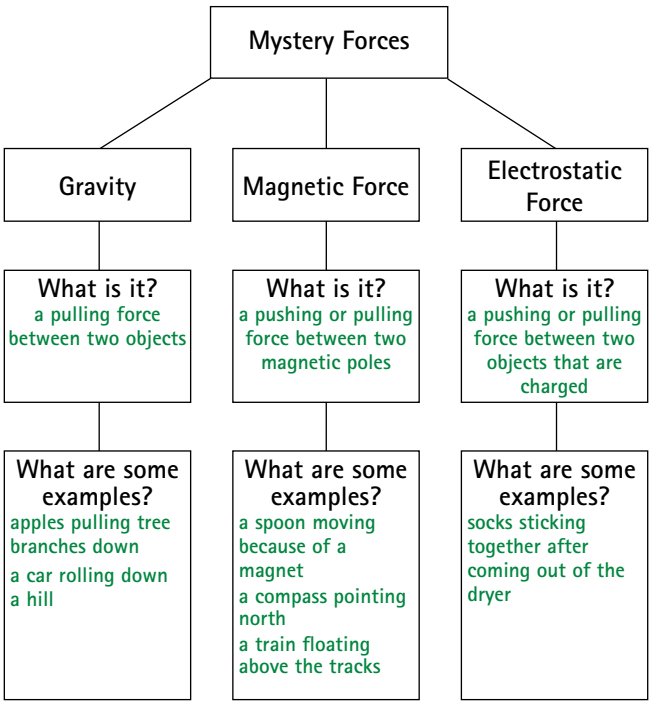
3. Ask students to turn to pages 4–5. Reread these pages as a class. Ask students to orally summarize the concept of *gravity*, while you record their responses on the large version of the concept map. Ask students to record this information on their student sheets.

4. Ask students to orally summarize the concept of *magnetic force*. Ask students to record on their student sheets what you write on the large concept map.

5. Ask students to orally summarize the concept of *electrostatic force* as you record the information on the large concept map. Have students record this information on their student sheets.

6. Tell students that they will now work in pairs to find examples of each type of force by rereading each of the mysteries on pages 7–18 in their books. Encourage them to identify the force for each mystery before turning the page to read the explanation.

***Mystery Forces* Concept Map**



7. After about 10–15 minutes, ask students to share their concept maps, telling which mystery forces belonged in each category. Ask students to explain how they decided where to place each example on their concept maps.

8. Ask students to study the picture on page 19 of the book. Challenge students to identify an example of each type of force shown in the picture. Invite students to add this information to their concept maps.

9. Ask students to look over their completed concept maps and think about what they have learned about forces. Have students reflect on how reorganizing the information into a concept map helped them understand what they read.

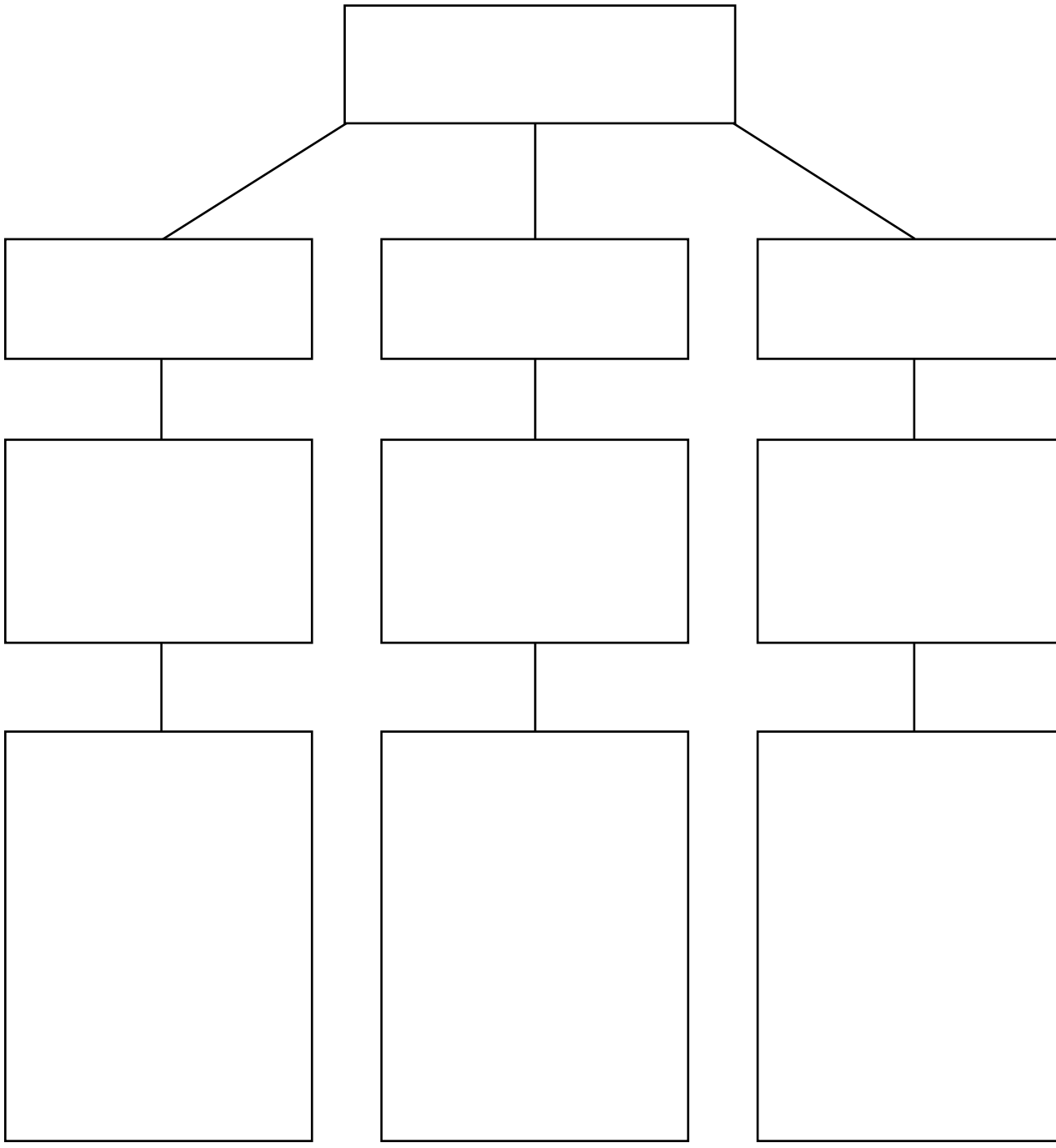
Independent Extension

Have students use their concept map to write about one of the "mystery forces" in the book. Ask students to select one of the three forces. On a separate sheet of paper, have them write a paragraph using the information from one branch of the concept map as a guide. Students can illustrate their writing with a labeled drawing that shows the force at work.

Name _____ **Date** _____

Concept Map

Title of book: _____



About Strategy Guides

A six-page strategy guide is available for each *Seeds of Science / Roots of Reading*® student book. These strategies support students in becoming better readers and writers; they help students read science texts with greater understanding, learn and use new vocabulary, and discuss important ideas about the natural world and the nature of science. Many of these strategies can be used with multiple titles in the *Seeds / Roots* series. For more information, as well as for additional instructional resources, visit the *Seeds / Roots* Web site (**www.seedsofscience.org/strategyguides.html**).

Student Books for Grades 2–3

Twenty-seven engaging student books are now available, each with a corresponding strategy guide. The books are part of the *Seeds of Science / Roots of Reading*® curriculum program described on page 6.

Soil Habitats	
Strategy	**Student Book**
Using Discourse Routines with Science Texts	*Into the Soil*
Using the Cognates Strategy	*Walk in the Woods*
Connecting Science Words and Everyday Words	*What Are Roots?*
Teaching About the Nature of Science	*Talking with a Habitat Scientist*
Teaching Text Structure	*Handbook of Forest Floor Animals*
Using Text Features	*Earthworms Underground*
Taking Notes Based on Observations	*My Nature Notebook*
Making Sense of Data in Science Texts	*Snail Investigations*
Using Discourse Circles	*Without Soil*
Shoreline Science	
Strategy	**Student Book**
Teaching Vocabulary with Science Texts	*Beach Postcards*
Teaching Concept Mapping	*What Belongs on a Beach?*
Teaching Scientific Explanations	*Gary's Sand Journal*
Interpreting Visual Representations	*What's Stronger? The Forces That Cause Erosion*
Using Text Features	*What Lives on a Sandy Beach?*
Teaching About Multiple Meaning Words	*My Sea Otter Report*
Searching for Information in Science Texts	*Handbook of Sandy Beach Organisms*
Teaching Text Structure	*The Black Tide*
Teaching About the Nature of Science	*Shoreline Scientist*
Designing Mixtures	
Strategy	**Student Book**
Using Discourse Circles	*What If Rain Boots Were Made of Paper?*
Using Anticipation Guides	*Solving Dissolving*
Teaching Scientific Explanations	*Handbook of Interesting Ingredients*
Teaching Text Structure	*Jelly Bean Scientist*
Teaching About the Nature of Science	*Jess Makes Hair Gel*
Gravity and Magnetism	
Strategy	**Student Book**
Interpreting Visual Representations	*Forces*
Making Sense of Data in Science Texts	*What My Sister Taught Me About Magnets*
Using Anticipation Guides	*Gravity Is Everywhere*
Teaching Concept Mapping	*Mystery Forces*

Extend Learning with *Seeds of Science/Roots of Reading*®

The strategy featured in this guide is drawn from the *Seeds of Science / Roots of Reading*® curriculum program. *Seeds / Roots* is an innovative, fully integrated science and literacy program.

The program employs a multimodal instructional model called "Do-it, Talk-it, Read-it, Write-it." This approach provides rich and varied opportunities for students to learn science as they ***investigate*** through firsthand inquiry, ***talk*** with others about their investigations, ***read*** content-rich books, and ***write*** to record and reflect on their learning.

Take advantage of the natural synergies between science and literacy instruction.

- Improve students' abilities to read and write in the context of science.
- Excite students with active hands-on investigation.
- Optimize instructional time by addressing goals in two subject areas at the same time.

To learn more about *Seeds of Science / Roots of Reading*® products, pricing, and purchasing information, visit **www.seedsofscience.org**

***Soil Habitats* Science and Literacy Kit**

SEEDS OF SCIENCE ROOTS OF READING®

Developed at Lawrence Hall of Science and the Graduate School of Education at the University of California at Berkeley.

Seeds of Science/Roots of Reading® is a collaboration of a science team led by Jacqueline Barber and a literacy team led by P. David Pearson and Gina Cervetti.

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