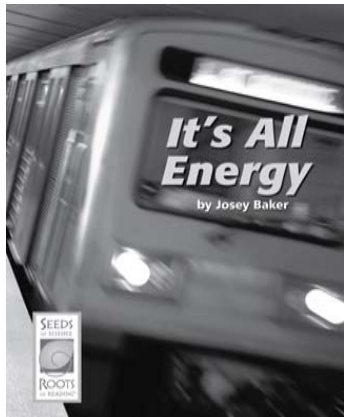


Teaching Concept Mapping

with *It's All Energy*

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-rich texts. Concept mapping supports students in making connections between known information and new information. By creating concept maps, students clarify their understanding of a 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 *It's All Energy*.

Book Summary

It's All Energy is an engaging book that introduces energy and its various forms. The first half of the book explains that energy makes everything we do happen and that every activity we engage in—from running to eating to listening to music—uses energy. Six forms of energy are introduced: electrical, motion, sound, thermal, light, and chemical. Items we use daily and situations from everyday life illustrate how people use these forms of energy. The second half of the book introduces readers to the idea that all energy can be transformed from one form into another and that these transformations serve many useful purposes. Several familiar examples help readers understand that these transformations are happening all around us.

About This Book

Reading Level

Guided Reading Level*: P

Key Vocabulary

energy, evidence, source, transform, transformation

Text Features

bold print, captions, glossary, headings/subheadings, photographs, table of contents

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

Science Background

There are many forms of energy. Some common forms that are observable in our everyday lives are electrical, motion, sound, thermal (heat), light, and chemical energy. Energy can change from one form to another. This is known as an energy transformation. There are many examples of energy transformations in daily life. Electronic devices such as computers, cell phones, and radios transform electrical energy into other forms of energy, such as motion, sound, thermal, light, or chemical energy. Cars, motorcycles, trucks, and planes transform the chemical energy in fuel into motion energy. When people talk, they are transforming motion energy into sound energy. Plants transform light energy from the Sun into chemical energy. Solar panels turn light energy into electrical energy. These are just a few of the countless energy transformations going on around us at any given moment. A key fact about energy, in any form, is that it does not just appear. Energy always comes from another source. Likewise, energy never disappears. It is always transformed to another form. People speak of energy as being used up, but that only means the energy is in a form we cannot tap into. For instance, the energy in a flashlight battery is not used up when it has been converted to other forms. That energy still exists, but is no longer in the battery.

About Concept Mapping

Concept maps are a visual way to represent relationships among ideas. Creating concept maps helps students integrate new ideas with their existing knowledge and affords them a process for organizing 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 to assess students' understanding of a topic. Concept maps are also useful for organizing ideas in preparation for writing. There are many possible ways to organize concept maps. The example used in this guide has a main topic on the left and specific examples connected to it on the right. For examples of concept maps that organize ideas in different ways, please visit the *Seeds/Roots* Web site (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 with concepts related to your curriculum. Good texts for teaching concept mapping have a clearly focused main topic or idea along with examples that further explain the main topic.
 - Think about which type of concept map best represents the information you want your students to consider. (You can use the Concept Map copymaster included with this guide or create one of your own.)
 - Create a planning copy of the concept map for your own reference. Fill in notes about relevant information from the text. You will use this planning copy to help guide discussion as you teach the lesson.
 - Before class, draw a large, blank version of the concept map on the board or on a piece of chart paper. Write the main topic students will be reading about on the concept map.
 - Explain to the class that a concept map is a tool readers construct to help them determine and organize important ideas from a text.
 - To activate background knowledge, introduce the text that students will be reading and briefly discuss the topic.
- As students read, have them locate examples that further explain the main idea you wrote on the concept map. Ask them to flag these examples in the text using sticky notes.
 - As students are reading, prompt them to reflect on how these examples relate to, illustrate, or further explain the main idea. This will help them synthesize important ideas from what they have read.
 - Have students share relevant examples they identified during reading. Record these on the concept map using short phrases. Ask students to suggest where to place their responses in relation to the other ideas on the concept map and to explain their reasoning.
 - To extend the activity, construct a paragraph with students' help. Organize ideas according to the structure of the concept map. Model turning the main topic into a main idea sentence. Ask students to transform examples into sentences that support the main idea.
 - Continue helping students learn about concept mapping by providing another text for students to read. This time, provide students with their own copy of a blank concept map. Have students read and record the main ideas and examples from the text. After reading, discuss the main ideas and clarify understanding.
 - Concept maps can be a flexible way to organize ideas for writing or reviewing central concepts from a unit of study. Have students work individually or with partners to complete their concept maps. Have students extend their ideas into a well-organized paragraph.
 - Continue to use concept mapping in science as well as in other subject areas. Once students begin to internalize this strategy, encourage them to create different forms of concept maps to organize ideas in any way they choose.

Teaching Concept Mapping with *It's All Energy*

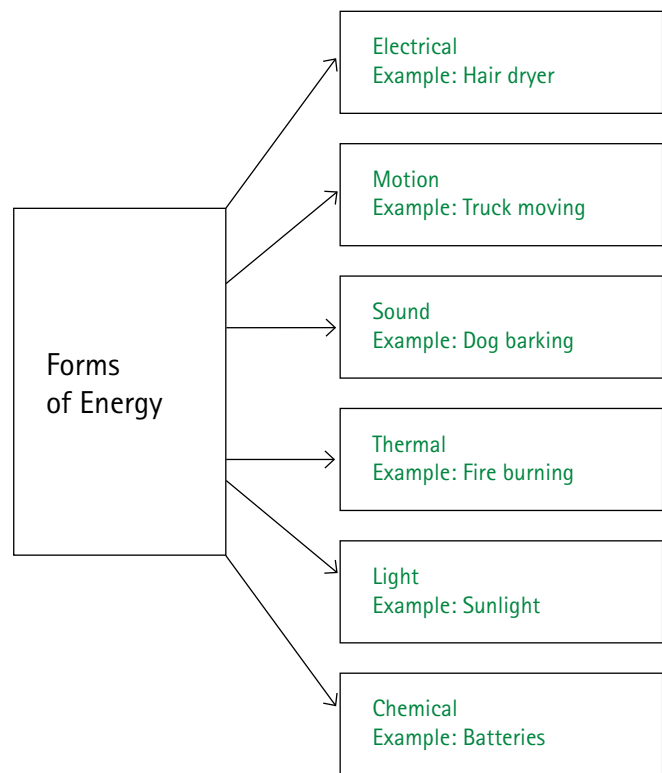
Getting Ready

1. Make a copy of the Concept Map copymaster for each student.
2. Draw a large, blank version of the concept map on the board or on a piece of chart paper.

Write “Forms of Energy” in the left-hand box, as shown in the illustration on this page. Leave the other boxes blank. (You will fill in the green text during class.)

During Class

1. Introduce *It's All Energy* and activate prior knowledge by asking students to share what they already know about energy and ways it is used.
2. Explain that a concept map is a tool that will help students reflect on and organize important ideas from reading. Tell students that the concept map on the board includes a main idea (forms of energy) from the book. As they read, they should look for examples of this main idea.
3. Have students read the first half of the book (pages 3–13) in a way that is consistent with your classroom routines, giving students as much independence as possible.
4. Ask students to name the six different forms of energy they read about. Record the six forms of energy on the concept map on the board. [Electrical, motion, sound, thermal, light, chemical.] Write one form of energy in each box.
5. Next, have students provide an example of each form of energy. Write each example in the appropriate box on the concept map.
6. Have students read the second half of the book (pages 14–23).
7. Distribute a Concept Map student sheet to each student. Explain that students should now complete their own concept map. Ask students to identify the main idea of the second part of the book. [Energy transforms from one form into another.] Have students write “Energy Transformations” in the left-hand box on their student sheets. Say that students should look for examples of energy transformations from the text and organize them on their concept maps in order to help them understand this main idea.
8. Model the process that can be used to record one transformation on the concept map. Begin by having students locate a heading in the text that tells about one transformation. [Motion



Energy Transforms into Sound Energy, page 16]. Have students write “Motion into sound” in the top box on their concept maps. Then, ask students for an example. [Drumming.] Have students write this example on their concept maps in the same box.

9. Provide time for students to work individually or in pairs, using the book to complete their concept maps.
10. To extend the activity, have students use their concept maps as a guide to help you construct a shared paragraph about energy transformations.
11. Continue to use concept mapping to aid students in making sense of what they read. Once students become more comfortable with concept mapping, provide opportunities for them to create their own concept maps and use them to organize ideas from reading.

Independent Extension

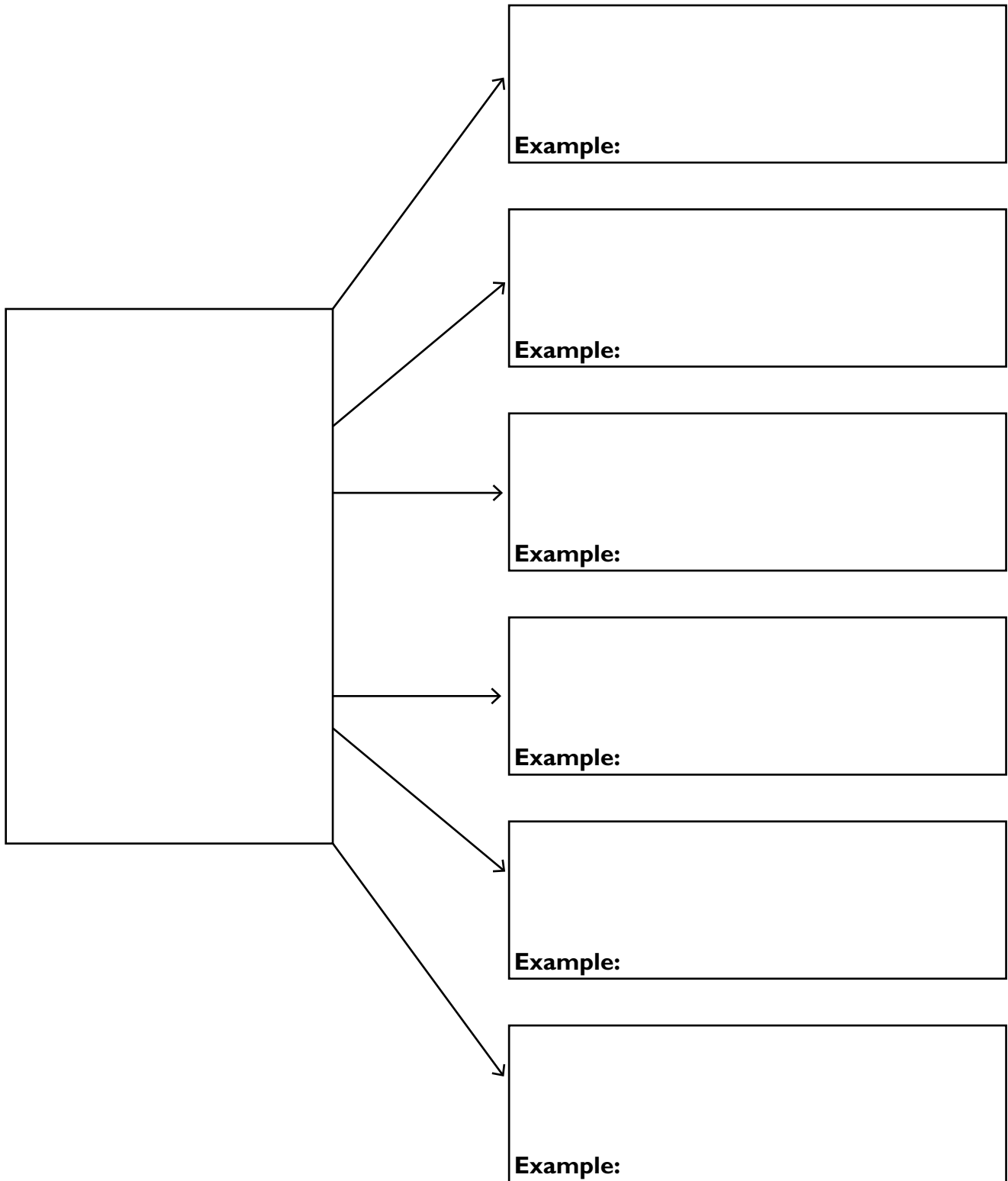
On a separate sheet of paper, have students use their concept map to write about one of the energy transformations they read about in *It's All Energy*. Encourage students to include an illustration and a caption to accompany their writing.

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).

Available Student Books for Grades 3–4

Eighteen 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. Nine *Weather and Water* student books and strategy guides will be available in late 2009.

<i>Digestion and Body Systems</i>	
Strategy	Student Book
Analyzing Part-to-Whole Relationships	<i>Systems</i>
Teaching About the Nature and Practices of Science	<i>Secrets of the Stomach</i>
Teaching Process Description Writing	<i>Voyage of a Cracker</i>
Searching for Information in Science Texts	<i>Handbook of Body Systems</i>
Making Sense of Data in Science Texts	<i>What's the Diagnosis?</i>
<i>Variation and Adaptation</i>	
Strategy	Student Book
Teaching Scientific Comparison Writing	<i>Blue Whales and Buttercups</i>
Using Discourse Circles	<i>The Code</i>
Using Visual Evidence to Make Inferences	<i>Mystery Mouths</i>
Teaching About the Nature and Practices of Science	<i>Evidence from the Past</i>
<i>Light Energy</i>	
Strategy	Student Book
Teaching About Idioms	<i>Can You See in the Dark?</i>
Teaching Summary Writing	<i>The Speed of Light</i>
Teaching About the Nature and Practices of Science	<i>Why Do Scientists Disagree?</i>
Using Discourse Routines with Science Texts	<i>I See What You Mean</i>
Searching for Information in Science Texts	<i>Handbook of Light Interactions</i>
Teaching Scientific Explanation Writing	<i>Light Strikes!</i>
Teaching Vocabulary with Science Texts	<i>Cameras, Eyes, and Glasses</i>
Teaching Concept Mapping	<i>It's All Energy</i>
Interpreting Visual Representations	<i>Sunlight and Showers</i>

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



Light Energy Science and Literacy Kit



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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