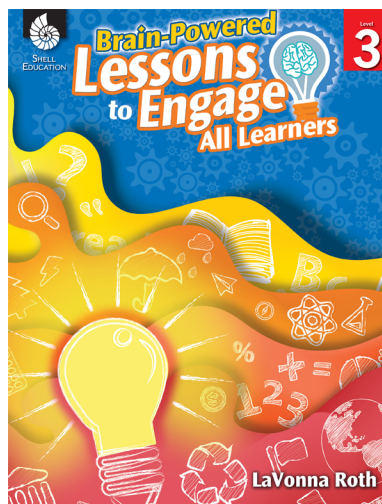


## Sample Pages from

# Brain Powered Lessons to Engage All Learners

## Level 3



The following sample pages are included in this download:

- Table of Contents
- Introduction excerpt
- Lesson plan

For correlations to Common Core and State Standards, please visit <http://www.teachercreatedmaterials.com/correlations>



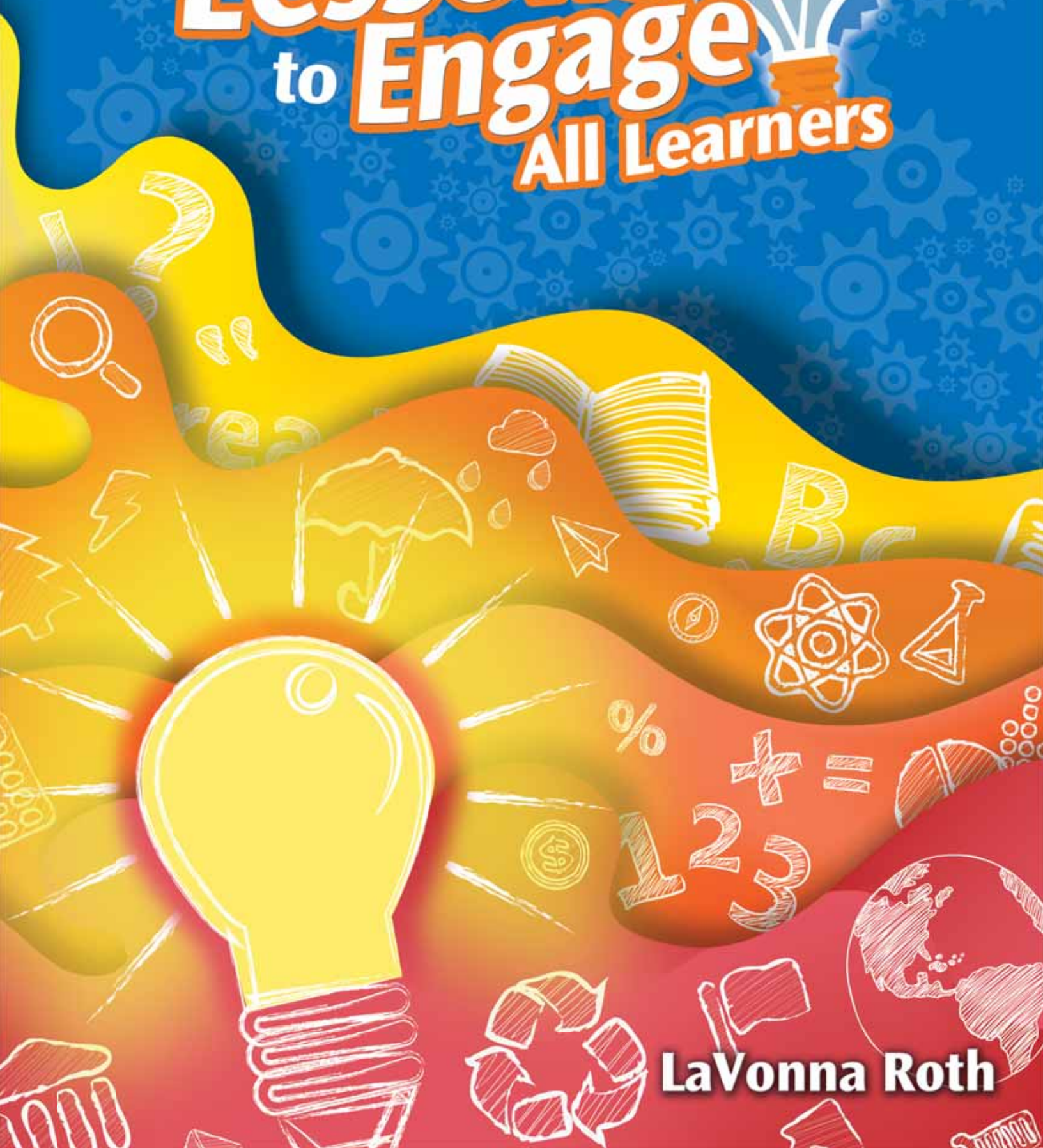
SHELL  
EDUCATION

# Brain-Powered Lessons to Engage All Learners



Level

3



LaVonna Roth

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# The Power of the Brain

“What actually changes in the brain are the strengths of the connections of neurons that are engaged together, moment by moment, in time.”

—Dr. Michael Merzenich

The brain is a very powerful organ, one we do not completely understand or know everything about. Yet science reveals more and more to us each day.

As educators, we have a duty to understand how the brain learns so that we can best teach our students. If we do not have an understanding of some of the powerful tools that can help facilitate our teaching and allow us to better target the brain and learning, we lose a lot of time with our students that could be used to serve them better. Plus, the likelihood of doing as much reteaching will lessen.

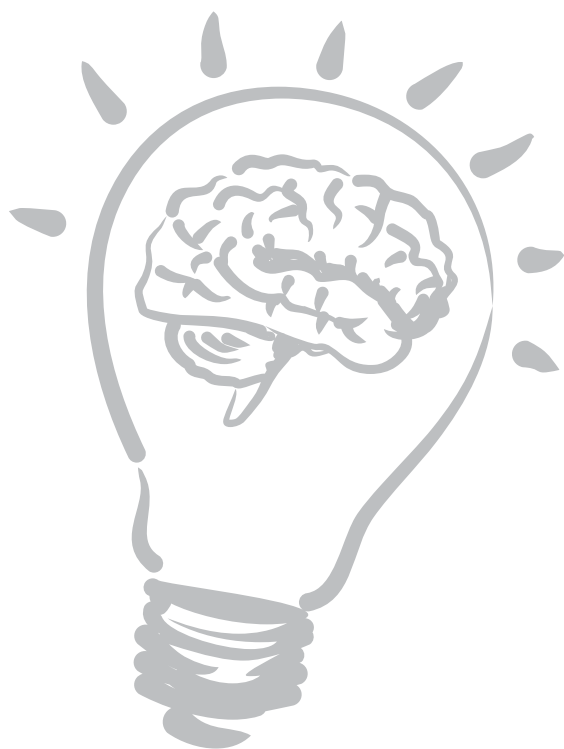
This is where *Brain-Powered Lessons to Engage All Learners* comes in! The eight strategies included within the lessons are designed around how the brain learns as a foundation. In addition, they are meant to be used as a formative assessment, include higher-order thinking, increase the level of engagement in learning, and support differentiation. For detailed information on each strategy, see pages 12–19.

## What Makes the Brain Learn Best

As you explore the strategies in this book, keep the following key ideas in mind.

The content being taught and learned must:

- ⊙ be engaging
- ⊙ be relevant
- ⊙ make sense
- ⊙ make meaning
- ⊙ involve movement
- ⊙ support memory retention



# The Power of the Brain *(cont.)*

## Be Engaging

In order for students to pay attention, we must engage the brain. This is the overarching theme to the rest of the elements. Too often, students are learning complacently. Just because students are staring at the teacher, with pencil in hand and taking notes, does not mean they are engaged. For example, we know that they are engaged when they answer questions or are interacting with the information independently with a teacher or another student. We don't always know when they are engaged just by looking at them. Sometimes, it's a simple question or observation of what they are doing that helps identify this. Body language can tell us a lot, but do not rely on this as the only point of observation. Many teachers may have not gone into teaching to "entertain," but entertaining is one component of being engaging. As neuroscience research has revealed, it was noted as early as 1762 that the brain does change (neuroplasticity) based on experiences (Doidge 2007). It rewires itself based upon experiences and new situations, creating new neural pathways. "Even simple brain exercises such as presenting oneself with challenging intellectual environments, interacting in social situations, or getting involved in physical activities will boost the general growth of connections" (HOPES 2010, §2). This is fantastic if we are creating an environment and lessons that are positive and planned in a way that fires more neurons that increase accurate learning.



**"Even simple brain exercises such as presenting oneself with challenging intellectual environments, interacting in social situations, or getting involved in physical activities will boost the general growth of connections" (HOPES 2010, §2).**

# The Power of the Brain *(cont.)*

As a reflection for you, think about the following with respect to student engagement:

- ⊙ What are the students doing during the lesson? Are they doing something with the information that shows they are into it? Are they asking questions? Are they answering?
- ⊙ What is their body language showing? Are they slumped, or are they sitting in a more alert position? Are their eyes glazed and half-closed, or are they bright, alert, and paying attention to where their focus should be?
- ⊙ Who is doing most of the talking and thinking? Move away from being the sage on the stage! Let the students be the stars. Share your knowledge with them in increments, but permit them to interact or explore.
- ⊙ What could you turn over to students to have them create a way to remember the content or ask questions they have? What could be done to change up the lessons so they are interacting or standing? Yes, parts of lessons can be taught by having students stand for a minute or so. Before they sit, have them stretch or high-five a few classmates to break up the monotony.

## Be Relevant

Why should the brain want to learn and remember something that has no relevance to us? If we want our students to learn information, it is important that we do what we can to make the information relevant. An easy way to achieve this is by bringing in some background knowledge that students have about the topic or making a personal connection. This does not need to take long.

As you will note, the lessons in this book start out with modeling. Modeling allows learners to have an understanding of the strategy and it also takes a moment to bring in what they know and, when possible, to make a personal connection. Consider asking students what they know about a topic and have them offer ideas. Or ask them to reflect on a piece of literature that you read or to ponder a question you have provided. For English language learners, this strategy is particularly effective when they can relate it to something of which they have a foundational concept and can make a connection to what they are learning. The language will come.

## Make Sense

Is what you are teaching something that makes sense to students? Do they see the bigger picture or context? If students are making sense of what they are learning, a greater chance of it moving from working memory to long-term memory will increase. Some students can be asked if the idea makes sense and if they clearly understand. If they are able to explain it in their own words, they probably have a good grasp on metacognition and where they are in their learning. Other students may need to be coached to retell you what they just learned.

# The Power of the Brain (cont.)

## Make Meaning

Once students have had an opportunity to make sense of what they are learning, provide an opportunity for them to make meaning. This means that they have a chance to apply what was learned and actually “play” with the skills or concepts. Are they able to complete some tasks or provide questions on their own? Are they ready to take the information to higher levels that demonstrate the depth of understanding? (Refer to Webb’s Depth of Knowledge for some additional insight into various levels of making meaning on pages 22–23.) For some students, simply asking a few questions related to what is being taught or having them write a reflection of what was just explained will allow you to check in on their understanding to see where they are before taking their thinking to a higher or a deeper level.

## Involve Movement

This one is particularly important because of the plethora of research on movement. Dr. John Ratey wrote the book *Spark*, which documents how student achievement soars based on some changes made to students’ physical education program in which students achieved their target heart-rate zone during their physical education time. Movement, particularly exercise, increases brain-derived neurotrophic factors (BDNF) that increase learning and memory (Vaynman, Ying, and Gomez-Pinilla 2004).

Knowing that getting students to achieve their target heart rate zone is not always an option, do what you can. Have students take some brain breaks that heighten their heart rate—even if for just a minute.

Movement has strong retention implications in other ways. Students can create a gesture connected to the lesson concept, or they can stand and move while they make meaning from what they learned. Movement is multisensory, thus, various regions of the brain are activated. When multiple brain pathways are stimulated, they are more likely to enter long-term potentiation from activating episodic and semantic memories.

If you come across a model lesson in this book in which not much movement is shared, or you find your students have been sitting longer than you may wish (you will know because their body language will tell you—unfortunately, we should have had them moving before this point), my challenge to you is to think of what movement you can add to the lesson. It could involve a gesture, a manipulative, or physically getting up and moving. If you are concerned about them calming back down, set your expectations and stick to them. Keep in mind that often when students “go crazy” when permitted to move, it’s probably because they *finally* get to move. Try simple techniques to bring students back into focus. “Part of the process of assisting children in developing necessary skills is getting to the root of why they behave as they do” (Harris and Goldberg 2012, xiv).

# The Power of the Brain *(cont.)*

## Support Memory Retention

If we want our students to retain what we teach them, then it is important that we keep in mind what causes our brains to retain that information.

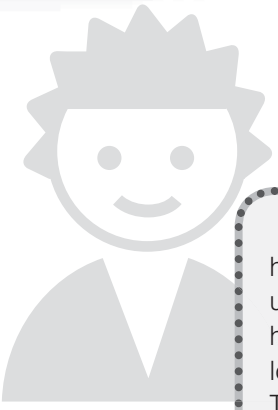
Key Elements to Memory Retention	Why
Emotions	We can create an episodic memory when we connect emotions to our learning.
Repetition	Repetition increases memory as long as there is engagement involved. Worksheets and drill and kill do not serve long-term memory well.
Patterns/Organization	When our brains take in messages, they begin to file the information by organizing it into categories.
Personal connection	Linking learning to one's self is a powerful brain tool for memory. This, too, can be tied to emotion, making an even stronger connection.
Linking new and prior knowledge	Taking in new information automatically results in connecting past knowledge to what is new.

(Roth 2012)

As you explore the strategies and lessons throughout this book, note how many of them incorporate the keys to memory retention and what engages our students' brains. As you begin to explore the use of these strategies on your own, be sure to keep the framework of those important components.

The bottom line—explore, have fun, and ask your students how they feel about lessons taught. They will tell you if they found the lesson interesting, engaging, and relevant. So get in there, dig in, and have some fun with your students while trying out these strategies and lessons!





# It's All About Me

## Strategy Overview

Think about the last argument you had with someone. Now, think about your happiest moment. Did the feelings come rushing back and your heart rate speed up, or did an expression cross your face? That is the power of emotion. Science has discovered “that the two structures of the brain that are mainly responsible for long-term memory are located in the emotional area of the brain” (Sousa 2006). Therefore, we need to do what we can to tie content to emotions so that the brain has a greater chance of storing what we teach for the long term.

In addition to emotion, movement and repetition are key to memory retention. In the *It's All About Me* strategy, students take a content area, recall what they already know (or predict what the content entails), and then find ways to make it personal. By making the connection personal, they tie it to a memory they have about someone or something. Be careful that students do not tie it to something personal that was stressful for them, as this can actually hinder the learning. Remember, learning occurs when a positive emotional response is experienced and dopamine, a feel-good chemical, is released. Neuroscience teaches us to incorporate emotions with our cognitive learning because it leads to “the most efficient and effective learning” (Immordino-Yang and Faeth 2010, 74).

### Strategy Insight

This strategy takes students through a process that exposes the content to be learned through multiple modalities: visual, auditory, kinesthetic, emotional, and, in some lessons, tactile. The way each lesson is modeled varies depending upon age group, but the core strategy remains consistent throughout all of the lessons. When a movement is learned and we tie it to something personal, we increase the chance of retaining the learning. Movement takes learning from abstract to concrete. It is about students and their connection to the world. Students may copy others, and that is acceptable as long as they can explain the connections and relate it to themselves, personally. Learning to make a personal connection to something is not always easy and usually takes practice.

### Teacher Notes

- ⦿ It is important to work with students on difference of opinion here and to respect another person's thoughts and opinions. Students may not understand another student's personal connection, and that is acceptable. You may want to role-play how to respect someone else by teaching them to say something such as “I had not thought of it that way,” or “I am glad you found a way to help you understand what we are studying,” or “Thank you for sharing with me.”
- ⦿ Since this is a personal connection, keep in mind to respect a student's privacy. They may create a way to remember that they do not want to share with you. Encourage them to brainstorm a way that can be shared.

# How to Use This Book

## Lesson Overview

The following lesson components are in each lesson and establish the flow and success of the lessons.

**Icons** state the brain-powered strategy and one of the four content areas addressed in the book: language arts, mathematics, science, or social studies.

Each lesson revolves around one of the eight **brain-powered strategies** in this book. Be sure to review the description of each strategy found on pages 12–19.

**Vocabulary** that will be addressed in the lesson is called out in case extra support is needed.

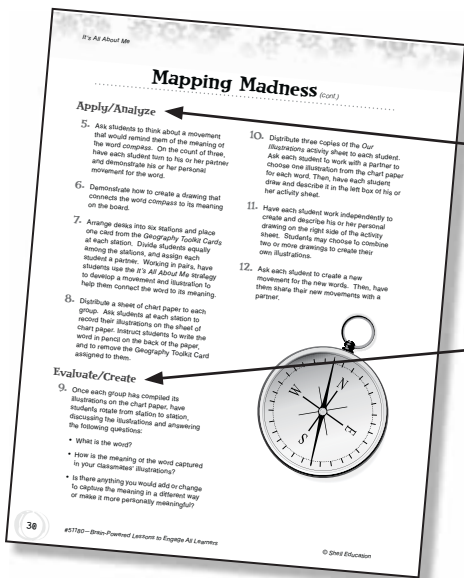
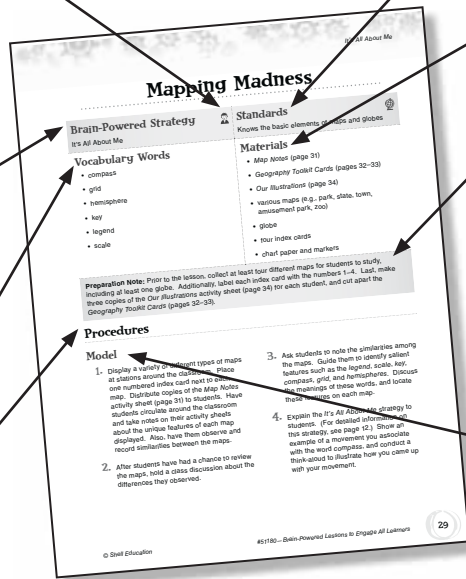
The **procedures** provide step-by-step instructions on how to implement the lessons successfully.

The **standard** indicates the objective for the lesson.

A **materials** list identifies the components of the lesson.

Many lessons contain a **preparation note** that indicates action needed prior to implementing the lessons. Be sure to review these notes to ensure a successful delivery of the lesson.

The **model** section of the lesson provides teachers the opportunity to model what is expected of students and what needs to be accomplished throughout the lesson.



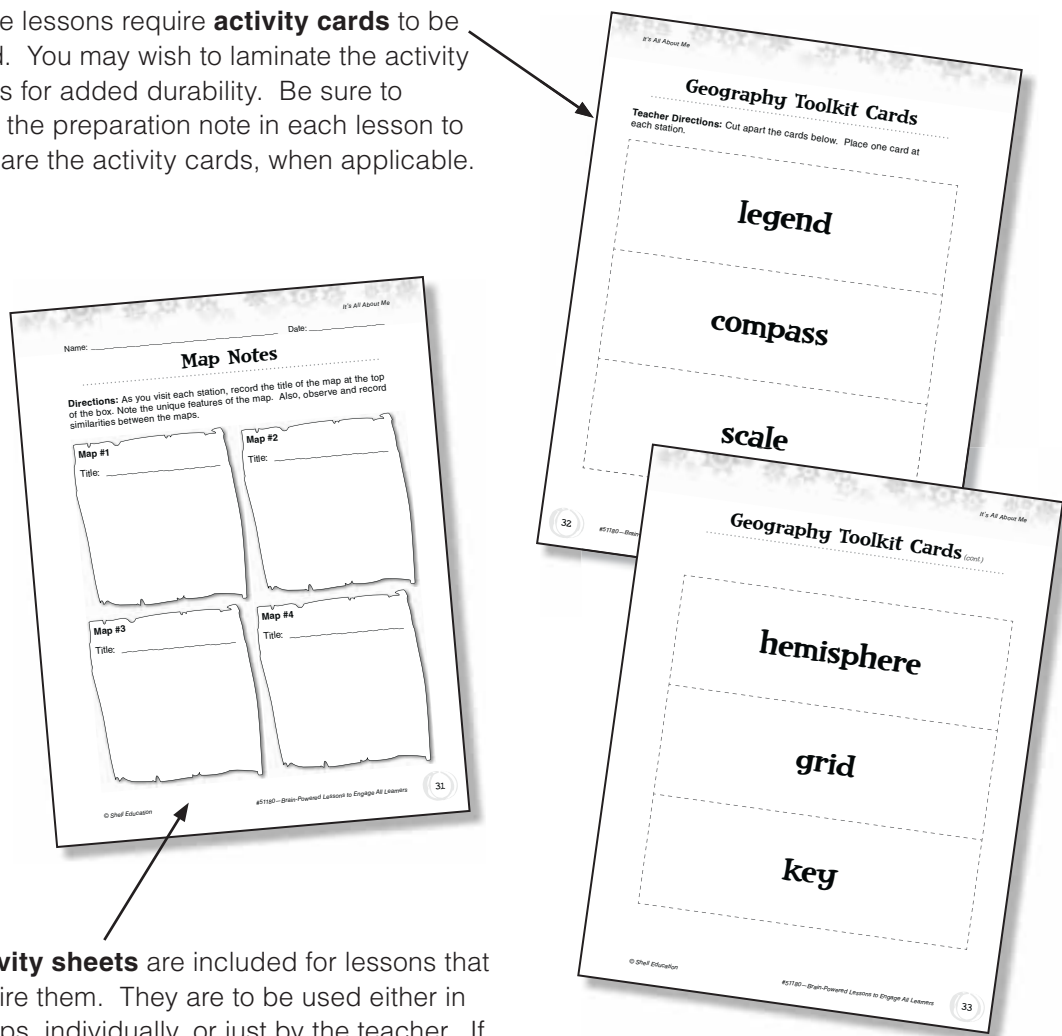
The **apply/analyze** section of the lesson provides students with the opportunity to apply what they are learning as they analyze the content and work toward creating a personal connection.

The **evaluate/create** section of the lesson provides students with the opportunity to think critically about the work of others and then to take ownership of their learning by designing the content in a way that makes sense to them.

# How to Use This Book *(cont.)*

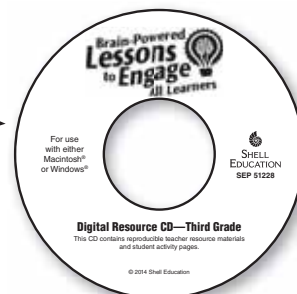
## Lesson Overview *(cont.)*

Some lessons require **activity cards** to be used. You may wish to laminate the activity cards for added durability. Be sure to read the preparation note in each lesson to prepare the activity cards, when applicable.



**Activity sheets** are included for lessons that require them. They are to be used either in groups, individually, or just by the teacher. If students are working in groups, encourage them to create a group name to label the activity sheet.

All of the activity sheets and additional teacher resources can be found on the **Digital Resource CD**.



# Mapping Madness

## Brain-Powered Strategy

It's All About Me



## Standard



Knows the basic elements of maps and globes

## Vocabulary Words

- compass
- grid
- hemisphere
- key
- legend
- scale

## Materials

- *Map Notes* (page 31)
- *Geography Toolkit Cards* (pages 32–33)
- *Our Illustrations* (page 34)
- various maps (e.g., park, state, town, amusement park, zoo)
- globe
- four index cards
- chart paper and markers

**Preparation Note:** Prior to the lesson, collect at least four different maps for students to study, including at least one globe. Additionally, label each index card with the numbers 1–4. Last, make three copies of the *Our Illustrations* activity sheet (page 34) for each student, and cut apart the *Geography Toolkit Cards* (pages 32–33).

## Procedures

### Model

1. Display a variety of different types of maps at stations around the classroom. Place one numbered index card next to each map. Distribute copies of the *Map Notes* activity sheet (page 31) to students. Have students circulate around the classroom and take notes on their activity sheets about the unique features of each map displayed. Also, have them observe and record similarities between the maps.
2. After students have had a chance to review the maps, hold a class discussion about the differences they observed.
3. Ask students to note the similarities among the maps. Guide them to identify salient features such as the *legend*, *scale*, *key*, *compass*, *grid*, and *hemispheres*. Discuss the meanings of these words, and locate these features on each map.
4. Explain the *It's All About Me* strategy to students. (For detailed information on this strategy, see page 12.) Show an example of a movement you associate with the word *compass*, and conduct a think-aloud to illustrate how you came up with your movement.

# Mapping Madness (cont.)

## Apply/Analyze

5. Ask students to think about a movement that would remind them of the meaning of the word *compass*. On the count of three, have each student turn to his or her partner and demonstrate his or her personal movement for the word.
6. Demonstrate how to create a drawing that connects the word *compass* to its meaning on the board.
7. Arrange desks into six stations and place one card from the *Geography Toolkit Cards* at each station. Divide students equally among the stations, and assign each student a partner. Working in pairs, have students use the *It's All About Me* strategy to develop a movement and illustration to help them connect the word to its meaning.
8. Distribute a sheet of chart paper to each group. Ask students at each station to record their illustrations on the sheet of chart paper. Instruct students to write the word in pencil on the back of the paper, and to remove the Geography Toolkit Card assigned to them.
10. Distribute three copies of the *Our Illustrations* activity sheet to each student. Ask each student to work with a partner to choose one illustration from the chart paper for each word. Then, have each student draw and describe it in the left box of his or her activity sheet.
11. Have each student work independently to create and describe his or her personal drawing on the right side of the activity sheet. Students may choose to combine two or more drawings to create their own illustrations.
12. Ask each student to create a new movement for the new words. Then, have them share their new movements with a partner.

## Evaluate/Create

9. Once each group has compiled its illustrations on the chart paper, have students rotate from station to station, discussing the illustrations and answering the following questions:
  - What is the word?
  - How is the meaning of the word captured in your classmates' illustrations?
  - Is there anything you would add or change to capture the meaning in a different way or make it more personally meaningful?



Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Map Notes

.....

**Directions:** As you visit each station, record the title of the map at the top of the box. Note the unique features of the map. Also, observe and record similarities between the maps.

**Map #1**  
Title: \_\_\_\_\_

**Map #2**  
Title: \_\_\_\_\_

**Map #3**  
Title: \_\_\_\_\_

**Map #4**  
Title: \_\_\_\_\_

# Geography Toolkit Cards

---

**Teacher Directions:** Cut apart the cards below. Place one card at each station.

**legend**

**compass**

**scale**

# Geography Toolkit Cards (cont.)

---

**hemisphere**

**grid**

**key**







Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Our Illustrations

.....

**Directions:** Write the provided word at each station and draw a picture of an illustration created by one of your classmates. Below each picture, describe the drawing, using words. Then, draw and describe your own illustration in the box in the column on the right.

Group Illustrations	My Illustrations
<b>Word:</b>	
 <hr/> <hr/>	 <hr/> <hr/>
<b>Word:</b>	
 <hr/> <hr/>	 <hr/> <hr/>