

# Table of Contents

## Introduction

A Letter to You . . . . .	5
About the Author . . . . .	6
The Power of the Brain . . . . .	7
Strategy Overviews . . . . .	12
How to Use This Book . . . . .	20
Correlation to the Standards . . . . .	24
Standards Chart . . . . .	25
Content Area Correlations Chart . . . . .	28

## Sort It Lessons

Rhyme Time . . . . .	29
Count It . . . . .	40
Sensational Senses . . . . .	54

## It Takes Two Lessons

Compare and Contrast . . . . .	61
Too Hot, Too Cold . . . . .	64
The Shape of Things . . . . .	68

## Kinesthetic Word Webs Lessons

Parts of a Book . . . . .	73
Sit On It . . . . .	79
Push and Pull . . . . .	84
Then and Now . . . . .	90

# 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.

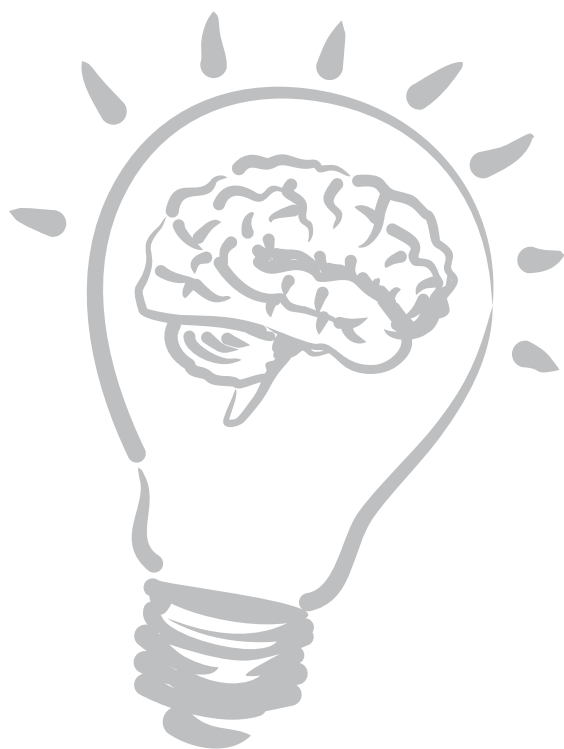
This is where *Brain-Powered Lessons to Engage All Learners* comes in! The eight strategies included within the lessons are designed around how the brain learns as a foundation. In addition, they are meant to be used as a formative assessment, include higher-order thinking, increase the level of engagement 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 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!

# Sort It

## Strategy Overview

As our brains take in information, we immediately connect it to something known and begin filing it accordingly (Willis 2008). Each lobe of the brain takes responsibility for different information that is transferred across regions by a massive neural system that would put social networks out of business. The corpus callosum, connecting both hemispheres, assists in the networking, allowing the two hemispheres to interact and help each other out (Vermillion 2010). Sousa (2006) explains that the brain evaluates new stimuli for clues to help connect incoming information with stored patterns, categories of data, or past experiences, thereby extending existing patterns with the new input. Once the sensory input reaches the hippocampus, it is ready to fuse into memory (Eldridge et al. 2010). This fusion, however, can only occur if the prior knowledge in stored memory is first activated and sent to the hippocampus to connect with the new information.

### Strategy Insight

In the *Sort It* strategy, students look for patterns, trends, or common themes as they sort through information and move around at the same time. Movement increases oxygen levels in the brain, which improves attention and leads to engagement. We are in a better position to learn when we move (Sousa 2006). In addition, the brain thrives on making predictions. Students predict where they think they fit and why. This is an important step in the learning process. Being wrong and being right helps our brain lock in on the learning. Either we are right and the brain celebrates with a burst of dopamine (pleasure) or we correct our thinking and the brain takes note of the correction because it wants to be right. This strategy allows students to make predictions about the topic of study and then explain their thinking. Students will have the opportunity to tap into their thinking, which provides the teacher an insight into where to make a correction or to celebrate their connection.

Throughout this process, students interact with the content while taking their thinking to a higher level. They physically move while looking at other students' cards and determine where they belong. During this process, they have already begun to predict as to what category they belong, and as they walk around, they confirm or shift their thinking based on what they see. Since there is the possibility of more than one answer, students can analyze and rearrange their original thoughts to justify the choices they make.

### Teacher Notes

- ⊙ Differentiate by giving easier words or concepts to students who are struggling.  
**Note:** We often underestimate the ability of a student. Let them struggle some so they learn, but not so much that they become frustrated.
- ⊙ During the mingle part of the strategy, tell students to work with various students and not the same people each time.

# 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.

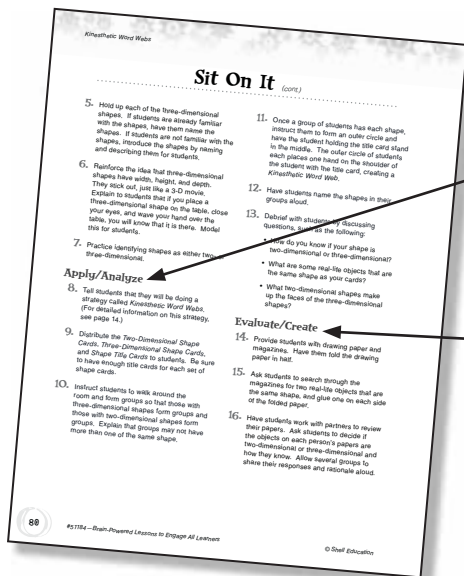
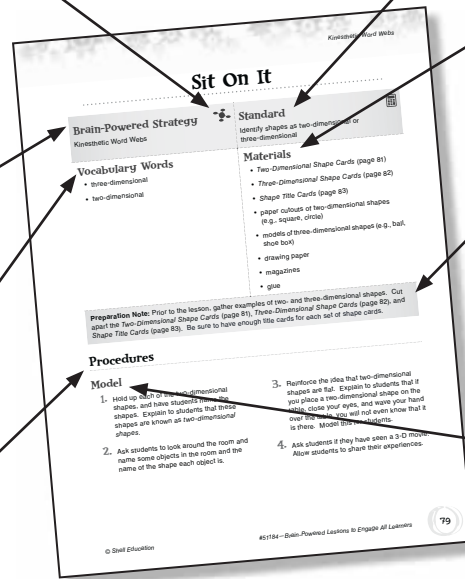
The **procedures** provide step-by-step instructions on how to implement the lessons successfully.

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.

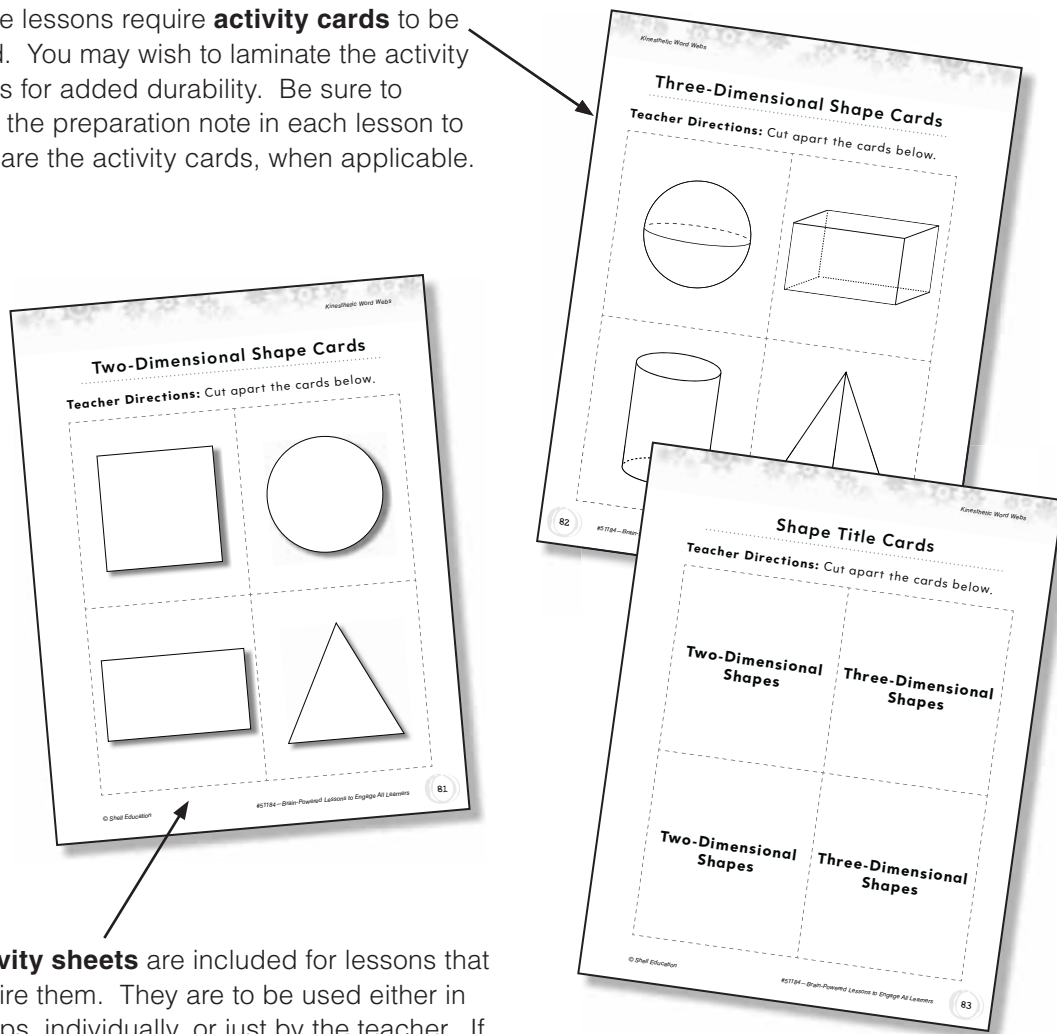
The **evaluate/create** section of the lesson provides students with the opportunity to think critically about the work of others and then to take ownership of their learning by designing the content in a way that makes sense to them.



# 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**.



# Rhyme Time

## Brain-Powered Strategy



Sort It

## Standard



Recognize and produce rhyming words

## Vocabulary Words

- rhyme
- sounds

## Materials

- *Rhyme Time Cards* (pages 31–39)
- rhyming book or song (e.g., *The Cat in the Hat* by Dr. Seuss)
- chart paper
- music (*optional*)

**Preparation Note:** Prior to the lesson, photocopy and cut apart the *Rhyme Time Cards* (pages 31–39). Have enough available so each student can have a card and so that there is a corresponding rhyme for each picture used.

## Procedures

### Model

1. Read the selected rhyming book or song to students. As you are reading, pause just before you read or sing a word that rhymes, and have students help supply the missing word.
2. You may wish to record a list of the rhyming words students heard.
3. Review with students that rhyming words are words that end with the same sounds. Say several pairs of rhyming words from the book or song, emphasizing the ending sounds.
4. Draw quick pictures of a bun, a star, and a sun on the board or on a sheet of chart paper.
5. Tell students that two of the pictures rhyme or sound the same. Say the words *bun* and *star*. Emphasize the ending sound of each word. Tell students that you hear *-un* at the end of *bun* and *-ar* at the end of *star*.
6. Say the words *bun* and *sun*. Emphasize the ending sound of each word. Tell students you hear *-un* at the end of *bun* and *sun*, so these words rhyme. Circle the *bun* and *sun* pictures to show they rhyme.
7. Repeat Steps 5–6, as needed, using other rhyming words and non-rhyming words.

# Rhyme Time (cont.)

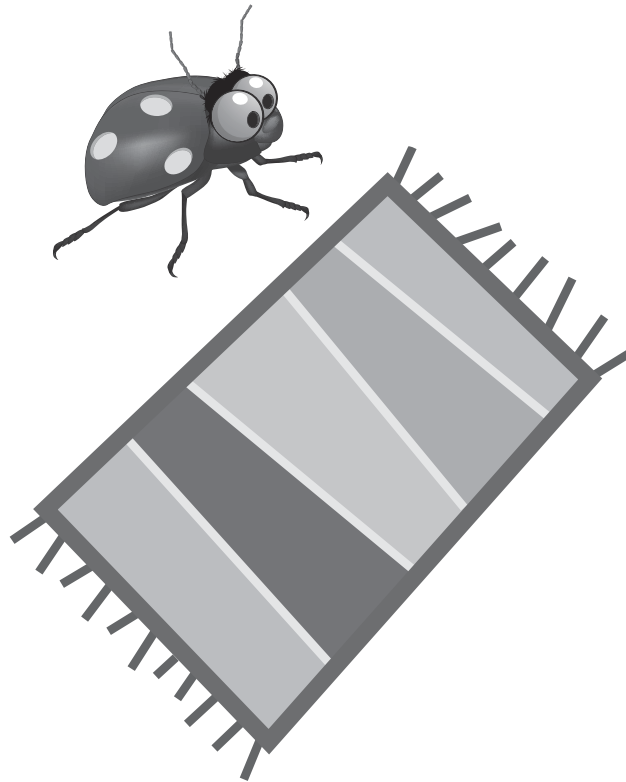
---

## Apply/Analyze

8. Distribute the *Rhyme Time Cards*, one to each student. Have students name the pictures shown on their cards.
9. Tell students that they will be doing a strategy called *Sort It*. (For detailed information on this strategy, see page 12.) Explain to students that they should find another student who has a picture that rhymes with the picture on their card.
10. Play music as students mingle around the room. Once students have sorted themselves, have pairs of students say the names of the pictures on their cards aloud so the whole class can hear the rhymes.
11. Redistribute the cards and have students play again.

## Evaluate/Create

12. Have pairs of students keep the cards they use for the last round played.
13. Have students work together to think of one more word that rhymes and one word that does not rhyme with the pair of words they had.
14. Ask students to be ready to share aloud the three words that rhyme and the one word that does not rhyme and be able to explain why it does not rhyme.



# Rhyme Time Cards

---

**Teacher Directions:** Cut apart the cards below.



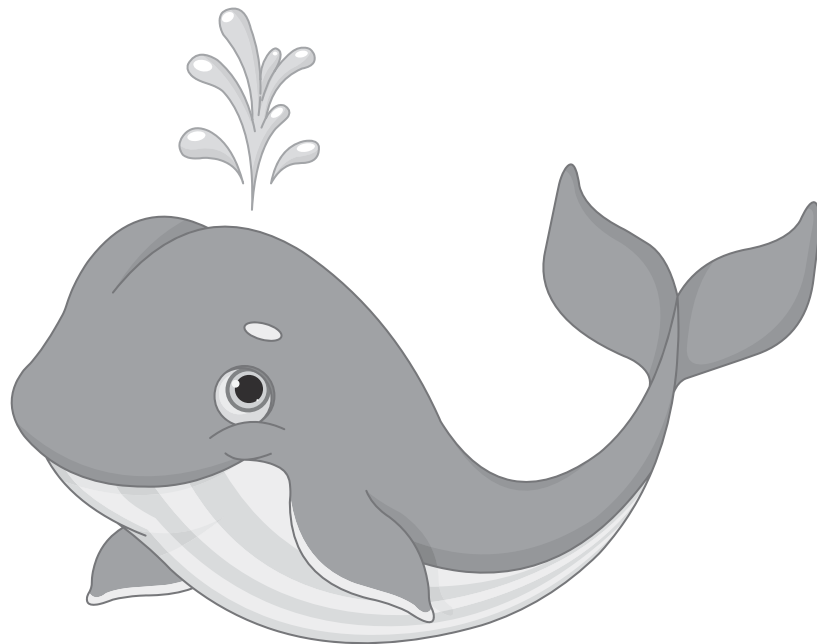
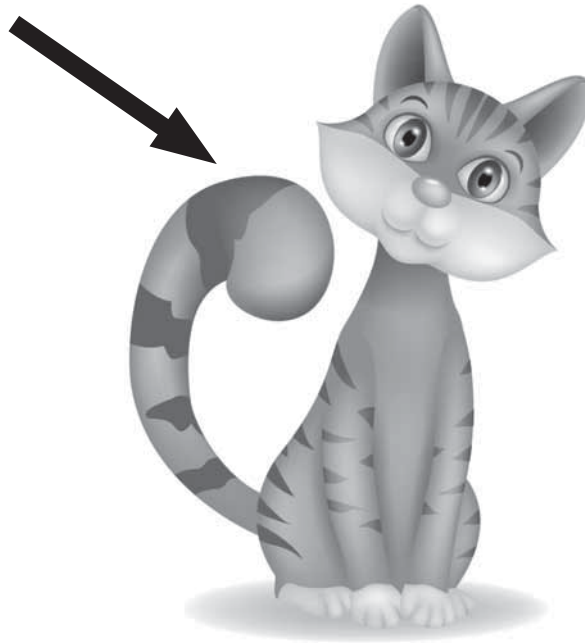
# Rhyme Time Cards *(cont.)*

---



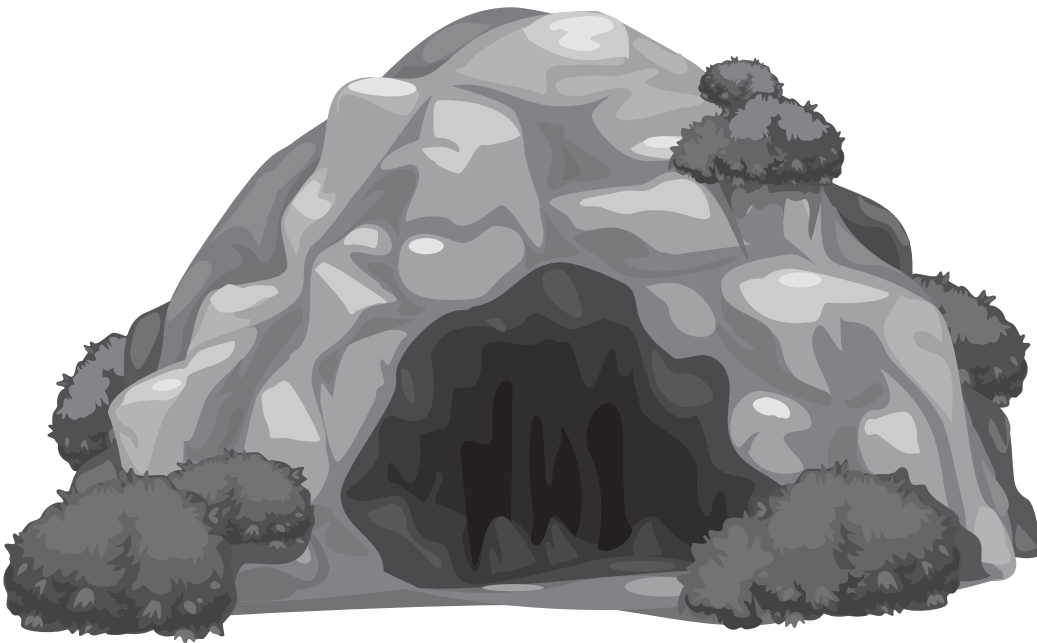
# Rhyme Time Cards *(cont.)*

---



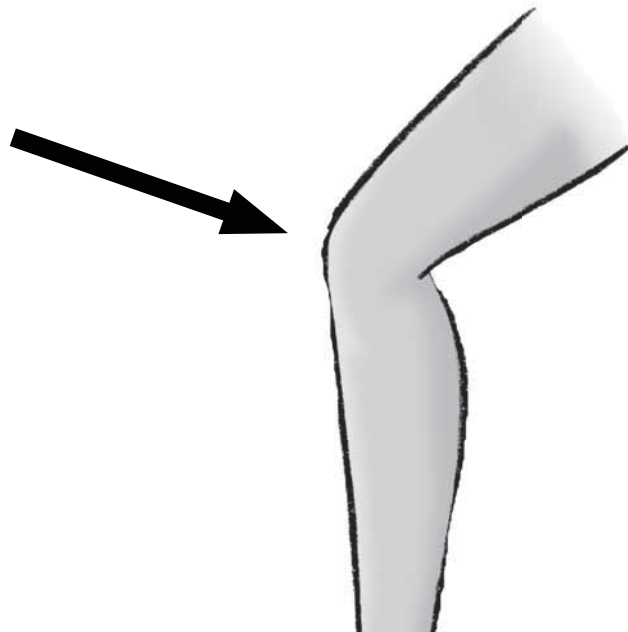
# Rhyme Time Cards *(cont.)*

---



# Rhyme Time Cards *(cont.)*

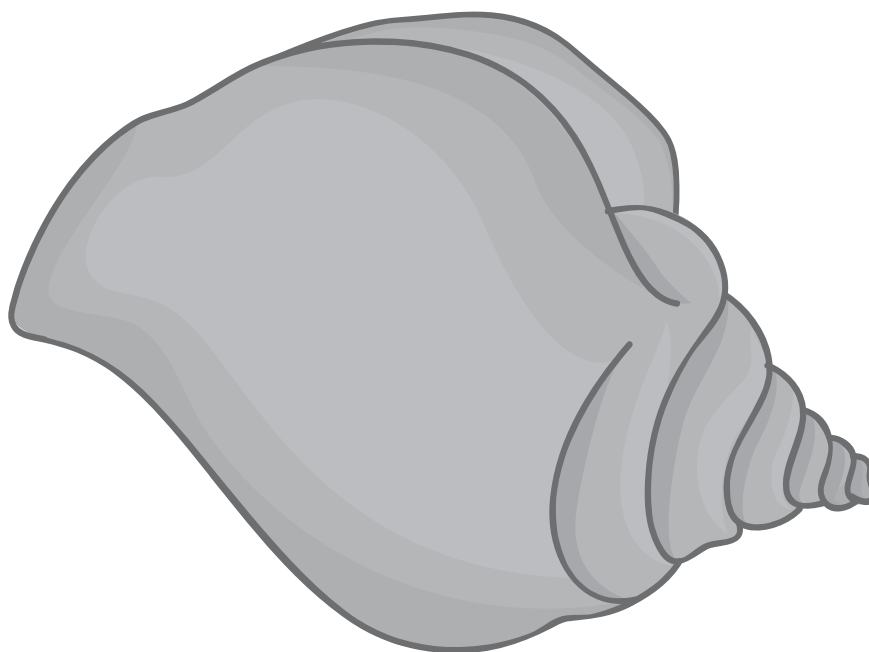
---





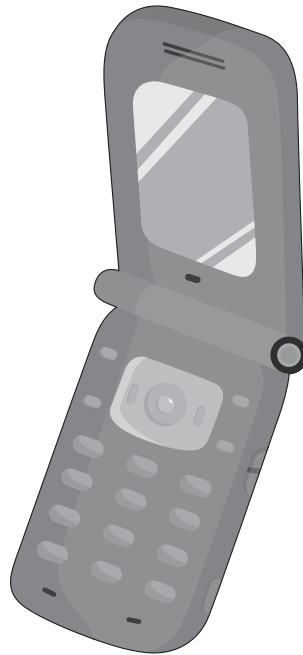
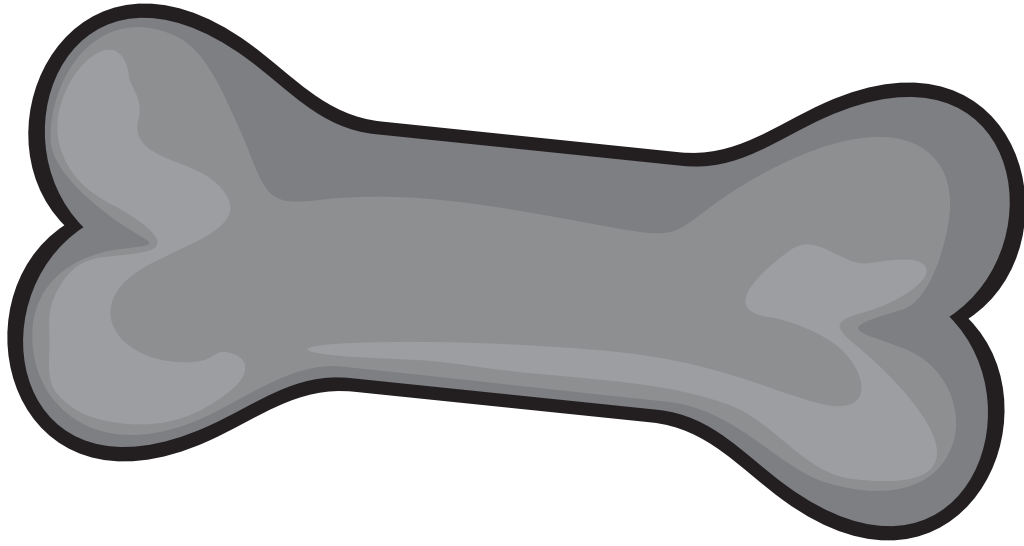
# Rhyme Time Cards *(cont.)*

---



# Rhyme Time Cards *(cont.)*

---



# Rhyme Time Cards *(cont.)*

---



# Rhyme Time Cards *(cont.)*

---

