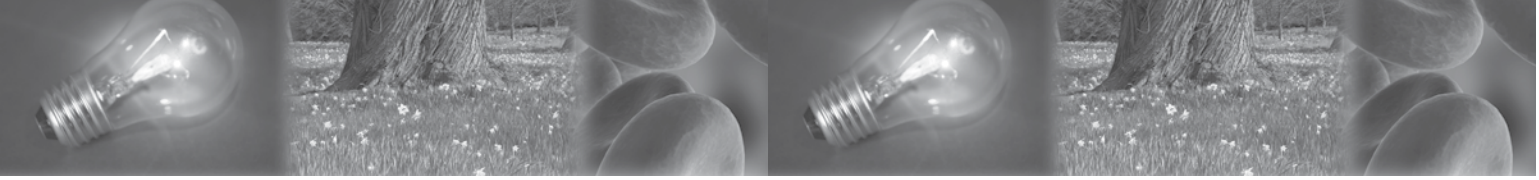

ARKANSAS DEPARTMENT OF EDUCATION

# STEM FOUNDATION 2: Critical and Close Reading of Nonfiction Text

# Power Point Handout

Teacher Created Materials
PUBLISHING



# Questioning Strategies for Science *(cont.)*

## Coding the Text

### Background Information

It is essential for students to self-monitor as they read so that they can check their understanding and use fix-up strategies if needed. Coding the Text is an activity that helps students to generate questions about the text and develop their metacognitive skills. The activity teaches students how to deal with areas of confusion when reading. The teacher performs a think-aloud when introducing the activity so that the students have a model for completing the task. During Coding the Text, students use sticky notes to mark the moments in the reading that are confusing and things they want to know more about.

### Grade Levels/Standards Addressed

Grades 1–2 (Standard 8.2)
Grades 3–5 (Standard 8.2)
Grades 6–8 (Standard 8.2)

### Activity

Write the codes on the board that students should use to make notes about the reading.

| | |
|---|---|
| ? | *I am confused/I don't understand* |
| M | *I want to learn more about this* |
| * | *This is important* |
| N | *New information* |
| C | *Connection* |
| TH | *Theme of the text* |
| AHA | *Big idea in the text* |

Emergent readers should be limited to the first two codes while more fluent readers can use more codes. Distribute sticky notes to the students and instruct them to place the notes in the text and code the text as they read. After students code the text, instruct them to generate questions based on the codes they have created. Share the questions in a classroom discussion in which the students attempt to answer the questions and generate more.

### Differentiation

ELLs may benefit from hearing the reading selection read aloud as they follow along. Students reading below grade level should use only three codes as they read, as too many might overwhelm them. Gifted students should be encouraged to explain why they placed the codes in the locations they did; push them to generate higher-order thinking questions.

## *The Gradual Release of Responsibility Model*

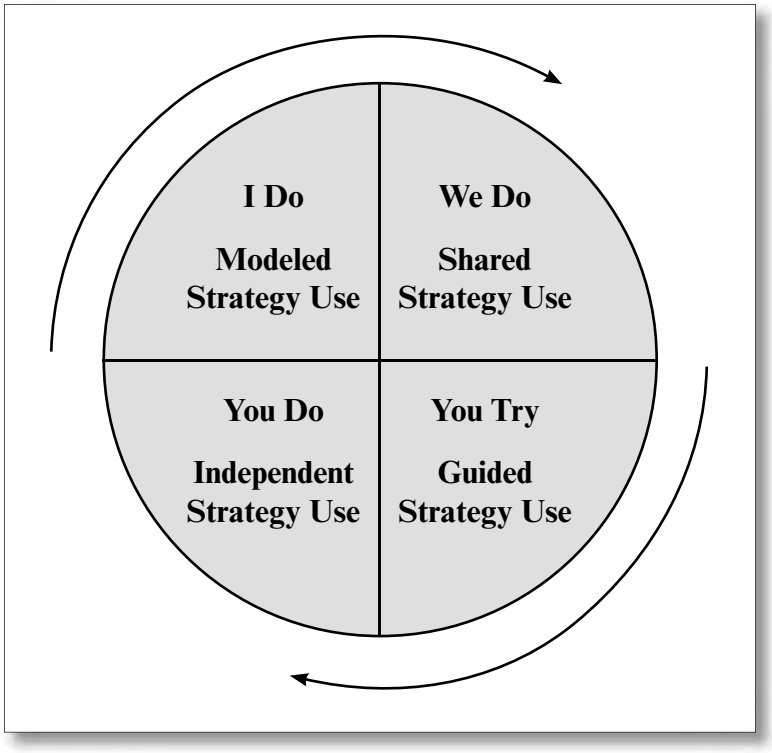
Focused, purposeful performance assistance supports students throughout the early phases of the ZPD through the use of thoughtful think alouds and explicit modeling, authentic conversations about the new learning, carefully considered questioning and teaching moves, powerful prompts and cues, and specific feedback. As the students try out the critical attributes of a reading strategy, they develop the self-talk and procedural processing that will eventually enable them to automatize and fossilize that strategy as they read. The intensity of support and assistance needed in the first phases of the ZPD varies from student to student. Teacher observation and informal assessment of where the students are in relationship to owning the reading comprehension strategy determine how the teacher structures lessons. The teacher moves from modeled demonstration of the strategy to shared, interactive practice to guided practice to independent practice and flexibility with the use of the strategy (Holdaway 1979; Pearson and Gallagher 1983; Tharp and Gallimore 1988). This instructional context moves students from the greatest level of teacher support to a minimal level of support as students take on an inner control of the strategy.

The gradual release of responsibility model (Pearson and Gallagher 1983) is a carefully structured instructional plan based on the concepts and stages of the ZPD. In this lesson design model, students develop critical-thinking and problem-solving strategies through initial support from the demonstration of strategic thinking and processing by the teacher.

The students then take on those strategic actions through a gradual release of responsibility from the teacher to the students. The teacher gradually decreases scaffolding support until the students independently incorporate the new patterns for learning into their own meaning-making processes. Four specific levels of teacher support represent this release of responsibility to the students: teacher control of the strategy through modeling and purposeful student-teacher conversations; shared, interactive engagement between the teacher and students through a collaborative use of the strategy; guided practice

of the strategy in which the students take control of the strategy and the teacher provides prompts, clarification, feedback, and support as needed; and finally, independent use of the strategy by the students (Pearson and Fielding 1991; Wilhelm 2001; Duke and Pearson 2002). The design of the STAR (Strategic Thinker and Reader) Model Lessons for reading comprehension instruction in this book reflects this gradual release of responsibility from the teacher to the student. Although the levels of assistance within the lesson structure are described in a linear fashion, students often move recursively through the lesson with the teacher responding to their needs. The teacher chooses to return to a more supportive level in the model when the students experience confusion or need brief, additional scaffolding in order to continue to move toward independent processing of a reading comprehension strategy. Figure 1.1 below illustrates the recursive nature of activities in this instructional model.

**Figure 1.1 The Gradual Release of Responsibility Model**



## *Phases of the Gradual Release of Responsibility Model*

### *I Do—Modeled Strategy Use*

At this level of instruction, the teacher introduces the strategy focus for the lesson and thinks aloud about the strategy:

- what it is
- why it is used
- how and when to use it

The teacher makes the implicit explicit by carefully breaking down and articulating the critical attributes of the strategy and mental pattern necessary to incorporate that strategy into an authentic meaning-making context (Pearson and Gallagher 1983; Jensen 2000). The teacher uses the metacognitive language of a reading expert, explaining short, comprehensible parts of the strategy while modeling how readers process text using this strategy. During the I Do phase, the teacher actively engages students in conversations about the work the strategy requires, providing concrete examples of the strategy's application and even visual models of the patterns of thinking employed by a reader when using the strategy.

### *We Do—Shared Strategy Use*

In this part of the lesson, the teacher still controls the strategy use but invites the students to enter the learning, sharing the actions of a reader in utilizing the comprehension strategy to process text. Students sample the language and actions of a strategic reader engaged with text as the teacher gradually passes increasing control of the strategy to the students. The actions of the students occur in a risk-free context, allowing them to come in and out of the collaborative experience as they begin to understand the procedural processes of the strategy. The teacher discusses the critical attributes of the strategy; prompts students to problem solve through short, purposeful examples and shared practice of the strategy; asks questions to help students reflect on the hows and whys of the strategy's application; and reframes or

redirects students' thinking when necessary. The teacher scaffolds and adjusts instruction through pacing, the increments of practice, the size of the text chunks, the reading level of the text, and the specificity of the language. The We Do portion of the lesson design is exactly that—a social experience shared between the expert and the novice during interactive engagement with targeted reading work.

## *You Try—Guided Strategy Use*

Now the level of teacher talk fades as the responsibility of the strategy is handed over to the students. At this phase of the lesson, students are working individually with the strategy; however, the teacher still maintains an active role through a guided-practice context. As they define the strategy for themselves, the students control the reading of the text through self-talk and the targeted actions of strategic, active problem solvers. The teacher is right there to drop in on readers and monitor, prompt and cue, clarify, redirect student intentions or reteach, and provide specific feedback for students. The teacher supports students' reflection on the reading by asking such questions as:

- What are you thinking right here?
- How did you solve this tricky part?
- When you did this (name action/behavior), what did you discover?
- How did doing this (name action/behavior) help you as a reader?
- What would happen if you considered this (name action/behavior)?

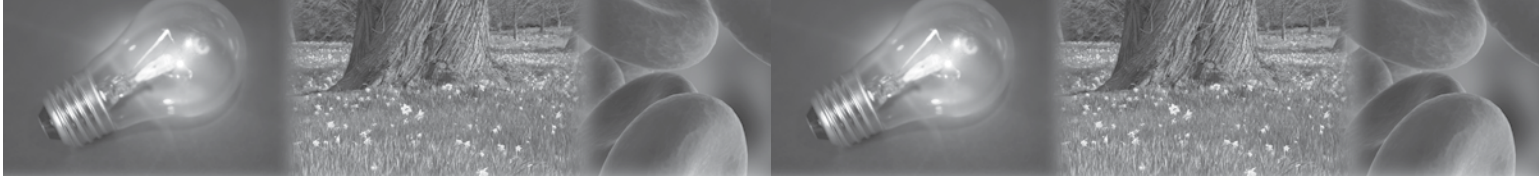
During this guided portion of the lesson, the teacher expects to see students making approximations and errors as they try out the strategy. The teacher specifically praises the students' attempts to problem solve and names what the students are doing as readers.

When necessary, the teacher intervenes to prevent the students from going too far astray and habituating procedural-processing (strategy) errors as they read. The teacher's interventions during guided practice

reinforce the behaviors of effective readers: they self-monitor meaning and try different "fix-up" strategies to reestablish understanding as they work through the text. Although the students focus on the featured strategy during the guided practice, the teacher recognizes or prompts the orchestration and integration of students' known comprehension-monitoring strategies as they read.

## *You Do—Independent Strategy Use*

During guided practice, the teacher uses observation and informal assessment to determine whether the students are ready to take on a reading comprehension strategy with minimal support. This means the students are ready to move into purposeful independent practice of the strategy. At this point, the students develop an inner control of the strategy's language and procedural processing, and the students' use of the strategy as they read becomes more fluid and automatic. The teacher is still available to monitor and assist when necessary, but the teacher's role changes significantly from side-by-side guidance to affirming and celebrating students' efforts. The goal for the You Do portion of the gradual release of responsibility model is to provide the students with real opportunities to practice the reading comprehension strategy with text at their instructional or independent level. The students develop flexibility and automaticity with the strategy through this independent practice, signaling the evolution of the strategy to a skill. (See Chapter 2 for more details about the development of a skill.) In the classroom, independent practice takes place in a variety of settings, including self-selected reading, reading in the content areas, literacy centers/workstations, and other comparable literacy engagements. Students become vital members of a reading community as they have conversations about their reading using the strategic language of *comprehenders* of text.



# Think-Alouds and Comprehension-Monitoring Strategies for Science

## Overview the Text Think-Aloud

### Background Information

Block and Israel (2004) note the importance of modeling what expert readers think before they read a large section of text. The Overview the Text Think-Aloud (Block and Israel 2004) uses mental modeling for students to demonstrate connections that readers make prior to actually reading and shows how to activate prior knowledge on a given topic. Teachers need to model for students how to examine the pictures, writing style, organization, genre characteristics, and other qualities in order to preview the text prior to reading because these actions improve comprehension.

### Grade Levels/Standards Addressed

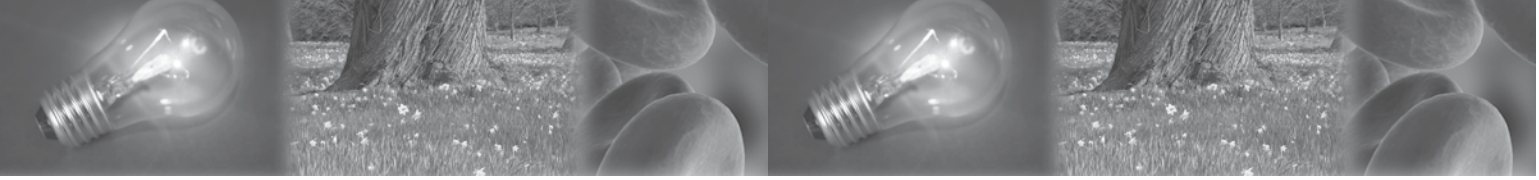
Grades 1–2 (Standard 5.7)
Grades 3–5 (Standard 5.8)
Grades 6–8 (Standard 5.4)

### Activity

Present a selection of text that you enjoyed personally and describe to the students what attracted you to it, how you knew you would like the topic, how many times you have read something on the subject or by the same author, etc. Explain the use of visuals and the qualities of this author's writing style, such as the genre, the density of the language or ideas, the sentence and paragraph length, the level of vocabulary, the organization, etc., that made the reading memorable. Hold up the reading selection and say:

**Grades 1–2** *Let's look at this book (story, paragraph, etc.). I wonder what it is going to be about. I can read the title. I've read other things about this topic before, and I liked those books. I have read another book by this same author. I liked it a lot. That means this book is probably good, too. I wonder if I can read all the words in this book. I love to look at the pictures in books, too. I wonder if this book has lots of pictures or if it is mostly words. Let me see. Next, I am going to check to see if there are titles on the pages. I think this book is going to be about…*

**Grades 3–5** *Before you start reading something new, take a look at the book carefully. Think about the topic and how much you want to learn about it. Read the title of the book and the name of the author. Think about if you enjoyed reading a book by the same author or on the same subject. Look over the reading to see if you can understand all of the words easily. Decide if the reading has too many pictures or too much writing. Check over the table of contents, headings, and subheadings. Try to guess what the reading is going to be about.*



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

## Overview the Text Think-Aloud *(cont.)*

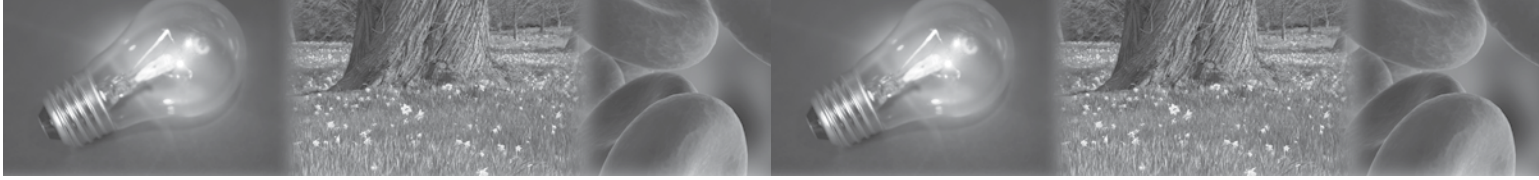
### Activity *(cont.)*

**Grades 6–8** *The first time you look at something to read, consider how much you want to learn about a topic. Read the title and author to see if you have enjoyed reading anything about that subject or by that author. Skim the reading to see if it contains too many difficult words for you to understand and read comfortably. Also, decide if the reading has too many pictures, too little information, or information you already know. Check over the table of contents, headings, and subheadings. Try to predict what will be covered in the selection. (Block and Israel 2004, p. 155)*

Finish the think-aloud by reminding students that they will begin to develop the skill to automatically complete an effective overview every time they choose a book, which will help them understand and enjoy their reading more.

### Differentiation

Use the reading material as a concrete example for ELLs. It is best to have the first reading selection on an overhead so that you can point to different sections. Repeat and rephrase key concepts and key vocabulary for ELLs as you think aloud. Be sure to show students reading below grade level how to identify the table of contents, headings, and subheadings. Use visual cues, as they may not be familiar with the organizing features of the text. Gifted students should be invited to share their thinking with the class and explain their thinking processes as much as possible.



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

## Preparing for the Topic Think-Aloud

### Background Information

Block and Israel (2004) express the need for students to learn how to think about a topic prior to reading. It is important for teachers and proficient readers to model for students how to think about the purpose and main ideas as they begin to read a selection for the first time. Closely examining the first few paragraphs increases students' comprehension because they can more rapidly identify the types of details that will reappear in a book. They can also predict more reliably how main ideas and detail sentences will be connected and what meaning will be revealed in later detail sentences.

### Grade Levels/Standards Addressed

Grades 1–2 (Standard 5.7)
Grades 3–5 (Standard 5.8)
Grades 6–8 (Standard 5.4)

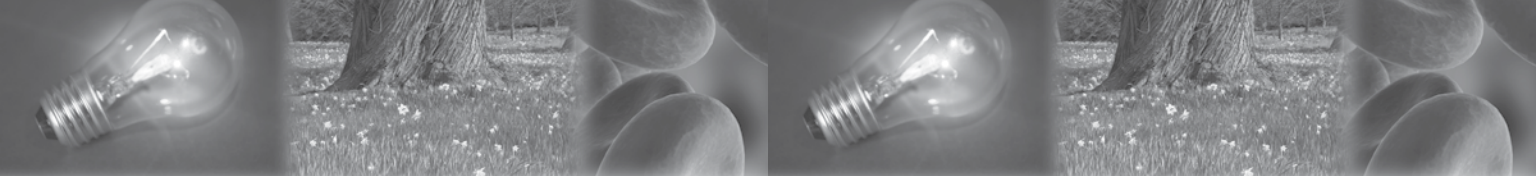
### Activity

Tell students that when they begin reading in science, they should think about the purpose and main ideas and pay particular attention to all details in the first few pages. Explain that these pieces of information are used to help the reader decide to continue reading (or listening). Tell students to familiarize themselves with the author's train of thought during the first few pages, so they can align their thinking in the same direction. Before the students begin reading, hold up the science book and say:

*When I begin to read nonfiction, I read the first few pages to put details together, identify if the author puts his or her main ideas as the first or last sentence of paragraphs, and find out what kinds of details this writer uses to describe a main point. By thinking these thoughts, I can more quickly follow the author's train of thought. (Block and Israel 2004, p. 156)*

Afterwards, read the first few paragraphs. Describe how you identify those sentences that are main idea statements and what kinds of details the author uses. Tell students that most authors put the most important or main idea statement either as the first or last sentence in a paragraph. If it is the first sentence, it usually introduces the topic of that paragraph and all remaining sentences describe something about that topic. If it is the last sentence, it usually ties all the details in the prior sentences together and is a more general summary statement.

Inform the students that detail statements answer the *how*, *why*, *when*, *where*, *who*, or *what* questions. Tell the students that most books rely on only one type of detail statement to move the sequence of ideas forward. By reading the first few paragraphs, students can determine which type of detail statement will be used in that selection.



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

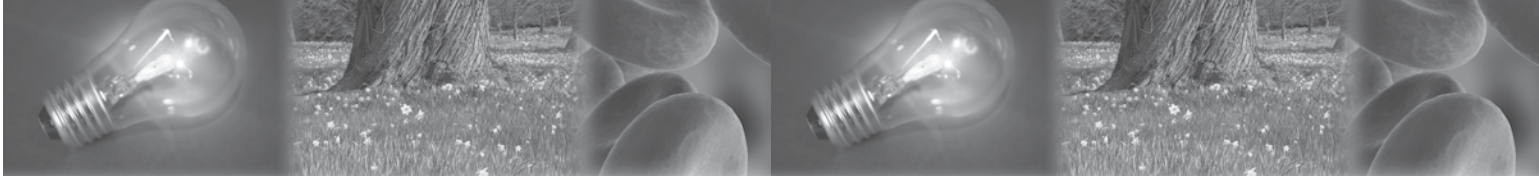
## Preparing for the Topic Think-Aloud *(cont.)*

### Activity *(cont.)*

Next, repeat the Preparing for the Topic Think-Aloud with a different reading selection on the same topic to demonstrate how to begin thinking about the topic and the author's train of thought within the first few pages. Discuss how different authors have different styles and patterns of writing about the same subject. Go into great depth in the examination of the detail statements. Finally, ask the students to describe their thought processes as they read the opening of another nonfiction selection.

### Differentiation

Use the reading material as a concrete example for ELLs. It is best to have the first reading selection on an overhead so that it can be referred to. Repeat and rephrase key concepts and key vocabulary for ELLs as you think aloud. Invite and encourage students reading below grade level and the rest of the class to share all of their thinking—even their struggling, negative thoughts—by modeling this for them. Invite gifted students to share their thinking with the class and explain their processes as much as possible, particularly when they run into difficulties.



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

## Look for Important Information Think-Aloud

### Background Information

Block and Israel (2004) note that expert readers know how to pay greater attention to important sentences, and they know how to ignore the minor details that may distract them from their goals. They present the following activity to assist students in learning how to locate the most important information in a reading selection after watching the process modeled by their teacher.

### Grade Levels/Standards Addressed

Grades 1–2 (Standard 5.7)
Grades 3–5 (Standard 5.8)
Grades 6–8 (Standard 5.4)

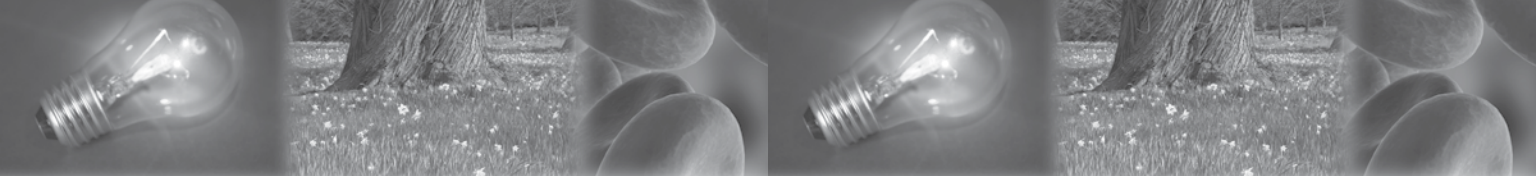
### Activity

Hold up the science textbook and turn to a chapter the students have not yet read. Say aloud:

**Grades 1–2** *At the beginning of a reading selection, the author usually tells you how to find the most important information. The author says certain words more than once. Sometimes the author says the same thing more than once. Sometimes the author gives examples. If you can find the author's big idea, then you can find the most important information faster. Notice how the most important thing to learn is right here (point to a sentence that contains a key idea and describe how you know it is important).*

**Grades 3–5** *At the beginning of a chapter or a book, the author gives clues to help you find the most important information. The author repeats important words and restates important ideas more often than others. The most important idea is usually followed by certain phrases such as for example, for instance, or to illustrate. Also, when you know where the author generally puts the main ideas in the paragraphs, it is much easier to find the most important points. For example, in this section, the author's most important points appear here in this paragraph (point to a sentence containing a key idea and describe how you know it is important).*

**Grades 6–8** *At the beginning of a chapter or book, the author reveals clues to help you locate and understand the most important information. The author repeats certain words and restates some ideas more frequently than others. Another clue is that the most important idea is often followed by a sentence that gives an example or contains the words for example, for instance, or to illustrate. Also, when you identify where the author places the main ideas in paragraphs, you can find the most important points more quickly. For instance, in this reading selection the author's most important points appear here in this paragraph (point to a sentence containing a key idea and describe how you know it is important). (Block and Israel 2004, p. 157).*



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

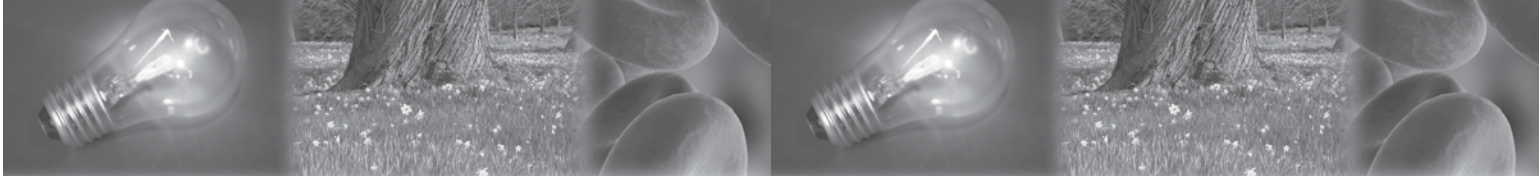
## Look for Important Information Think-Aloud *(cont.)*

### Activity *(cont.)*

Ask the students to follow along as you read the next paragraph. Have them work in pairs to identify the clues that point out the most important idea or sentence in that paragraph. Continue asking the students to perform Look for Important Information Think-Alouds as a whole group, in small groups, in pairs, and individually until the class can do it independently. Monitor the students individually as they read silently.

### Differentiation

Place the key phrases *for example, for instance, such as,* and *to illustrate* on the board to help ELLs identify them while reading. Make sure to rephrase and repeat key concepts and words for ELLs. Students reading below grade level will benefit from having the selection placed on an overhead transparency so that they can follow the instructions very closely. It may be necessary to provide gifted students who are expert readers with a more challenging reading selection.



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

## Activate Prior Knowledge Think-Aloud

### Background Information

As reading researchers assert, the best readers activate their prior knowledge and background experiences prior to reading (Duke and Pearson 2002). In doing so, they make it possible for new information that they encounter to be organized in an accessible locale within their schemata. Struggling readers need guidance and modeling via the think-aloud technique so that they can see how expert readers make connections between what they already know and what they are learning. This technique teaches them how to make connections when they are reading independently.

### Grade Levels/Standards Addressed

Grades 1–2 (Standard 5.7, 7.4)
Grades 3–5 (Standards 5.8, 7.6)
Grades 6–8 (Standard 5.4, 7.4)

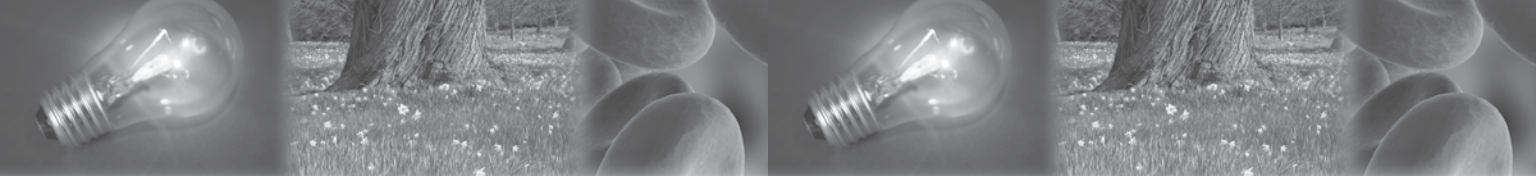
### Activity

Select a section of text for the students to read. After they have read about four pages, interrupt the students. Say:

**Grades 1–2** *When you listen to someone read or when you read by yourself, you can think about what you know about the topic. What things have you heard about the topic? What have you done or seen that is related to the topic? You could stop paying attention, but you might miss something important. Good readers pay close attention to what is being read. They stop and they think about what they know about the topic. They think about what they have seen or done in their own lives. I am going to show you how I think about what I know as we continue to read the next page.*

**Grades 3–5** *After reading the first few pages of any reading material, you can continue to read carefully and think about things you have learned or experiences you have had that are very similar to the information in the reading. Or, you can let your mind wander rather than concentrate on the words in the reading. Good readers follow along with the words, pausing briefly to recall background knowledge or similar experiences they have had in their lives. Let me show you how I activate my prior knowledge as we continue to read the next page. (Block and Israel 2004, p. 158)*

**Grades 6–8** *What you know about a topic prior to reading about the topic is very important. After you begin reading, it is very important to think about your experiences and knowledge that are related to the information in the reading. You could just let your mind wander instead of concentrating on the words and details, but that wouldn't help you much. Good readers follow the author's words closely, and they pause to recall their background knowledge or similar experiences they've had in their lives. Let me show you the connections I make to what I already know as we continue to read the next page.*



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

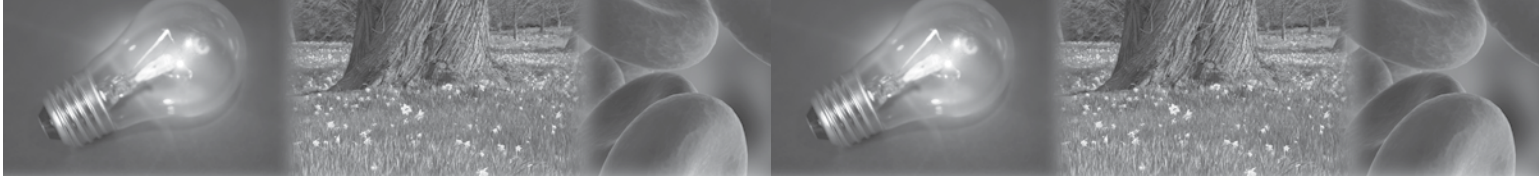
## Activate Prior Knowledge Think-Aloud *(cont.)*

### Activity *(cont.)*

Using a transparency of a single page of science text, point to specific sentences in which you connect relevant prior knowledge. Demonstrate how you activate your similar personal experiences and how you eliminate irrelevant or inaccurate prior knowledge. Read a sentence and describe an event from your personal experiences that contributes to the new information of that statement. Make the connections perfectly clear to students. Ask the class to practice and discuss activating prior knowledge. Have each student perform the think-aloud in small groups, then pairs, and finally in one-on-one conferences.

### Differentiation

It is very important that think-alouds be performed very slowly and that the words be enunciated very clearly for ELLs. Choose your words carefully and try to explain your thinking in a number of ways. Students reading below grade level should have the task modeled for them in their small groups by students who are reading at or above grade level. This will lower their anxiety levels for conducting their own think-alouds. While it may seem ideal to have gifted students model their thinking during reading for the rest of the class, do this with care. Some students may feel intimidated by the skills demonstrated. Be sure to focus on creating an atmosphere of mutual respect for think-alouds to incorporate gifted students' skills effectively.



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

## Determine Word Meanings Think-Aloud

### Background Information

Most students resort to skipping over words that they do not understand when they are reading. Looking up unknown words in the dictionary creates such an interruption for most readers that it causes them to disconnect from the reading. They lose their place and train of thought during the process and end up rereading a large selection of the text.

In nonfiction science reading materials, it is common for writers to use long, difficult words that students have never encountered before. However, writers usually provide clues that help readers figure out the meanings of those words. It is important to teach students how to use the different types of context clues to decipher the meaning of unknown words. Using context clues effectively helps students develop better fluency and speed when reading, which encourages more pleasure reading and increases standardized test scores.

### Types of Context Clues

Many types of context clues are worthy of direct instruction to improve reading comprehension during science instruction:

**Apposition or Definition Clues** Authors of nonfiction texts often provide synonyms or definitions of difficult words to help the reader to understand the reading material. Usually, the definition or synonym is signaled to the reader by a comma, dash, parentheses, or words and phrases such as *or*, *is called*, *which means*, *who is*, *called*, *means*, *which is*, *that is*, and *in other words*.

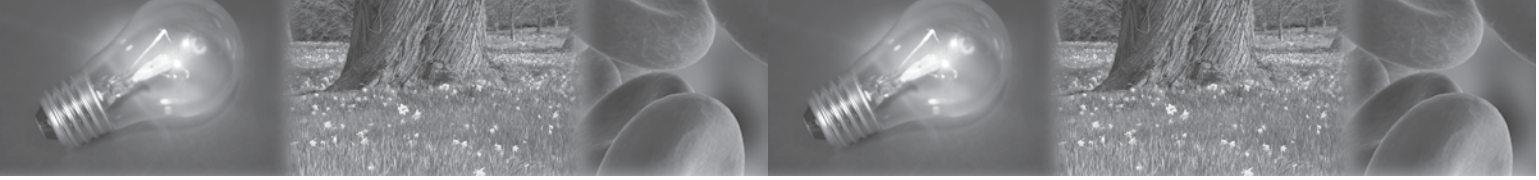
*Example:* Some objects float, or stay on top of a liquid. Others sink, or drop to the bottom of a liquid.

**Example Clues** Writers provide examples that illustrate and clarify difficult to understand concepts or ideas. The example usually appears in the same sentence as the new word or in sentences that come before or after the word and can help the students to figure out the meaning of a new word or concept. The signal phrases for examples are *such as*, *including*, *for instance*, *to illustrate*, *are examples of*, *other examples*, and *for example*.

*Example:* A few reptiles can generate some heat from their own body. For example, some lizards in the southwestern United States can keep their body temperature at about 34°C, even when the air temperature is cool.

**Contrast Clues** Writers sometimes indicate the meanings of difficult words or concepts through the presentation of the opposite meaning. Signals for opposition include *although*, *even though*, *yet*, *but*, *however*, *on the other hand*, and *in contrast.*

*Example:* If light hits new matter straight on, it keeps going straight. But if light hits the new matter at a slant, the light bends.



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

## Determine Word Meanings Think-Aloud *(cont.)*

### Types of Context Clues *(cont.)*

**Modifier Clues** Sometimes modifiers (words that describe another word), such as adjectives, adverbs, or relative clauses, contain clues to a word's meaning. Relative clauses begin with *who*, *which*, *that*, *whose*, or *whom* and often explain or extend an idea or word in the main part of a sentence.

*Example:* The whooping crane is a bird that lives in wet, swampy areas, where it eats snakes and frogs.

**Repetition Clues** Writers often repeat difficult words in familiar and new situations so that readers can figure out the meaning of the unknown words using their prior knowledge.

*Example:* A mammal is an animal that feeds its young milk. A mammal also has hair or fur on its body.

**Suggested Meaning Clues** When a sentence contains no specific clue words or explanations, the ideas in the sentence often suggest the meaning of words the students may not know. They should study the sentence as a whole and try to learn the meaning of the unknown word by asking questions about the information in the sentence. Students can draw on their prior knowledge and experience to help them decipher the meaning of the word.

*Example:* Snakes move by using the contractions of their muscular bodies.

### Grade Levels/Standards Addressed

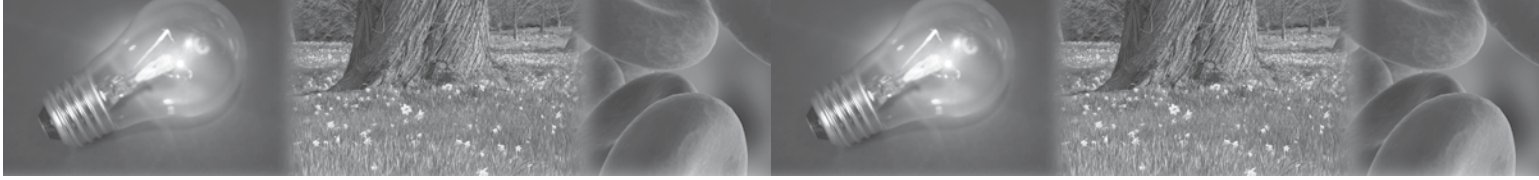
Grades 1–2 (Standard 5.7, 7.4)
Grades 3–5 (Standard 5.5, 5.8)
Grades 6–8 (Standard 5.4)

### Activity

Prior to the reading of a selection from the textbook, ask the students to locate any words they do not recognize or do not understand. Write the words on the board. Read the text aloud with the students. When you come to the word in question, say the following:

*This is a word I don't know. There are a few things I can do to help me figure out what this word means. First, I need to reread the sentence to see if I can figure it out. No, that didn't help. I'll try to read some sentences before and after the word to see if that might give me some clues. Are there any context clues? If not, maybe I can figure out the meaning by looking at the root word. Have I ever seen this word in another situation or book? What do I remember about it? I have read about this topic before. Let me think of things I remember about this topic to give me some clues.*

Be sure to let the students know that they do not have to go through all of the questions you model for them as you try to figure out the meaning of the word. They need to question themselves until they find a possible answer. Allow the students to use the clues to identify the meaning of the words they have selected. Encourage them to check the dictionary to determine if they were right. This will give them more confidence in using context clues.



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

## Determine Word Meanings Think-Aloud *(cont.)*

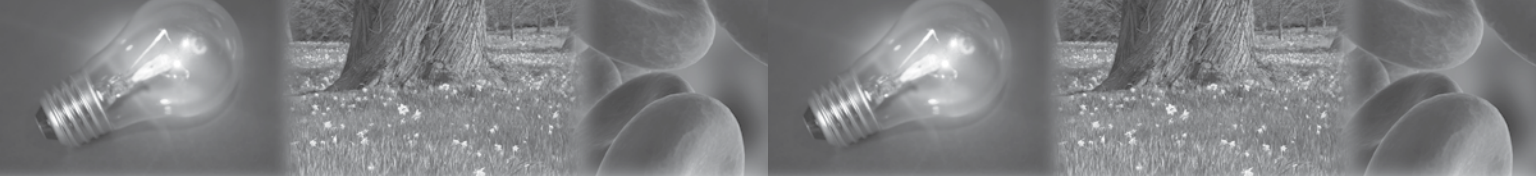
### Variation

Students in Grades 1–2 may not be able to read with great fluency, but they can still use context clues to decipher the meaning of unknown words. Teach them to use the following prompts for figuring out unknown words (Robb 2003):

- Did that sound right?
- Find the part that was not right.
- Take a good look at the beginning, middle, and end of the word.
- Does what you say match the letters you see?
- Can you think of another word it looks like?
- Can you say the word in chunks or syllables?
- Does the word have a prefix? What is it?
- Does the word have a suffix? What is it?
- Can you say what's left of the word?

### Differentiation

ELLs will benefit from one-on-one instruction with context clues during the explicit instruction phase. Students reading below grade level should be paired with strong readers during guided instruction and guided practice for modeling purposes and to provide extra support. It may be necessary to select an alternate section of the text for this activity for ELLs and students reading below grade level. Gifted students should be assigned to read a section of text appropriate for their reading level and encouraged to participate in the discussion of how to decipher unknown words so that their expert decoding skills can benefit the whole class when modeled.



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

## Predict Think-Aloud

### Background Information

Researchers have established that expert readers revise their understanding and predict as they read (Block and Pressley 2003). Making predictions in science allows students to create a purpose for reading because they read to find out if their predictions are correct. It is effective for students to learn how to revise their predictions by watching and listening to their teachers model for them in the Predict Think-Aloud (based on Block and Israel 2004).

### Grade Levels/Standards Addressed

Grades 1–2 (Standard 5.7)
Grades 3–5 (Standards 5.8)
Grades 6–8 (Standard 5.4)

### Activity

Read a small section of text. Make some predictions about what might happen. To explain how to make accurate predictions, pause and describe what was in the text that helped you to make your prediction. Keep reading, and deliver a Predict Think-Aloud. Say:

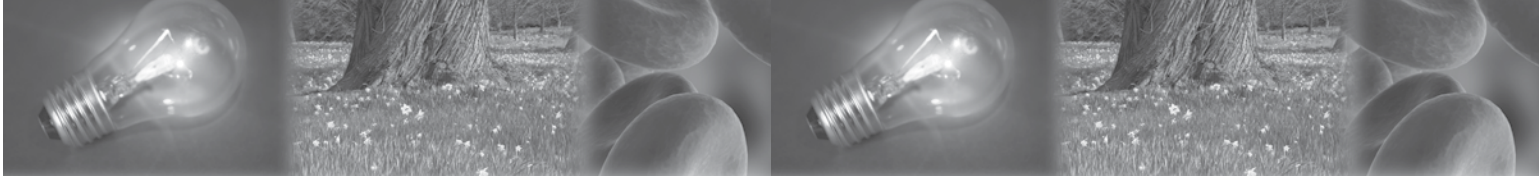
*My prediction is X. I have come to this prediction because the author left clues to tell me what would happen. The author used certain words and repeated phrases. Here are the questions that I asked myself while I was reading so that I could make predictions:*

- *What clues did the author give me?*
- *What did I already know that helped me to make a correct prediction?*
- *What did I miss that caused my prediction to be wrong? (Block and Israel 2004)*

Over the course of a few weeks, ask students to practice adding to, or changing, what they think to make predictions while they read.

### Differentiation

It is essential to model this think-aloud for ELLs because they may struggle to articulate how they came to their predictions. Slow the speech rate; choose appropriate words to describe the scene to the reader; and use an appropriate volume, intonation, and pauses to aid the students in understanding the meaning. Students reading below grade level should have a predictable text to work with as they learn how to monitor their own reading comprehension and determine the number of questions to ask for clarification of what they do not understand.



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

## Ask Questions Think-Aloud

### Background Information

Asking students questions about what they have read has long been a staple of education. Teachers traditionally check for students' successful comprehension through questioning. There is no doubt that students need to have the skills to answer questions successfully, but to do that, they should know how to generate and anticipate the questions worthy of asking. Reading researchers agree that expert readers ask and answer questions of themselves as they read to monitor their understanding of the material. Research shows that when students learn to generate questions about the text as they read, their overall comprehension improves (Yopp 1988 as cited by Duke and Pearson 2002). The Ask Questions Think-Aloud (Block and Israel 2004) is designed to assist students to check the validity of their ideas, to clarify their thinking, or to signal that they need to reread or read ahead.

### Grade Levels/Standards Addressed

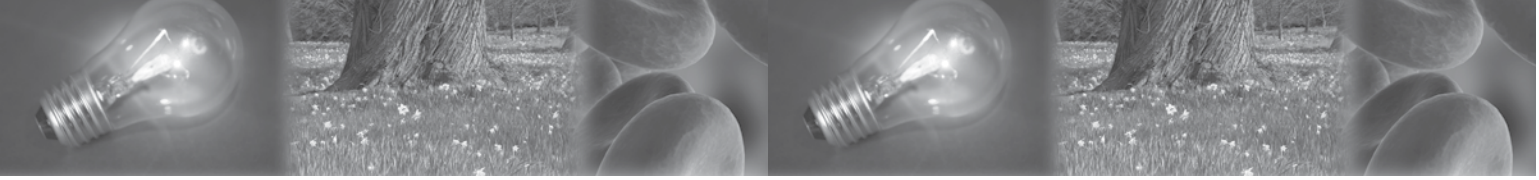
Grades 1–2 (Standard 5.7)
Grades 3–5 (Standards 5.5, 5.8)
Grades 6–8 (Standard 5.4)

### Activity

As students are reading a section of text independently, say:

**Grades 1–2** *Sometimes when I read, I don't understand. When I don't understand, I ask questions. I ask, 'What don't I understand? Is it a word I don't recognize? Can I break the word into chunks that I can recognize? Why doesn't the sentence make sense to me? Do I need to reread the sentence to see if I can figure it out, or should I read ahead to see if I can figure it out later? Can I look at the pictures to get a better idea of what it means?' After that, I ask myself questions like a journalist. 'Who or what is the main idea? What is happening? Where? When? Why?'*

**Grades 3–5** *Sometimes when I read, I get confused. When I don't understand something, I stop and ask myself questions. I ask, 'What don't I understand? Is it a word? Is it the way this sentence connects to the previous sentence? Is the sentence confusing? Is it a bigger idea than the one that occurred before? Is the sentence so long that I need to go back and reread, or should I go ahead and see if I can figure it out later?' After I ask myself questions like these, I can find the reason for my confusion and add whatever thoughts I need to read on with understanding. At that point, I can begin to ask myself questions so that I can summarize and remember what I have read. I ask myself, 'What is important? What is happening? Who or what is involved? Where is it happening? When is it happening? How does it happen? Why is it important?'*



# Think-Alouds and Comprehension-Monitoring Strategies for Science *(cont.)*

## Ask Questions Think-Aloud *(cont.)*

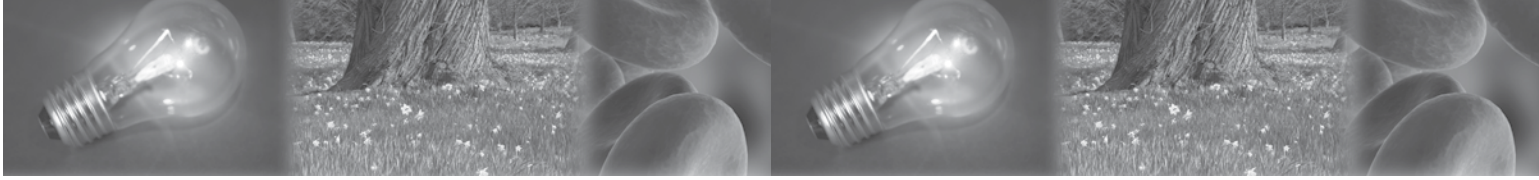
### Activity *(cont.)*

**Grades 6–8** *Sometimes when I read, I come across sections that are confusing. Whenever I don't understand a word or a sentence, I remember that I need to stop and ask questions. I ask, 'What is it about this sentence that I don't understand? Is it a word? Is it the string of ideas connecting this sentence to the previous sentence? Is the sentence unclear? Is it a bigger idea than the one that has occurred before? Is the sentence so long that I need to go back and reread, or should I read ahead to get more context clues?' Once I have asked myself questions like these, I can find the reason for my confusion and add whatever thoughts I need to continue reading with understanding. I also need to ask myself questions so that I can summarize what I have read. I ask myself, 'What is important? What is happening? Who or what is involved? Where is it happening? How does it happen? Why is it important?'*

Read aloud more of the text to determine if the students' thinking is correct. Ask the students to use the same thought processes as they read the text silently from that point. Meet with the students individually and assess their abilities to ask questions by asking them to pause and describe their thinking as they read.

### Differentiation

ELLs may struggle to find the words to describe their thinking. It may help to have a list of words, phrases, or sentence frames available that are associated with think-alouds. Gifted students and students reading below grade level can use a reading selection that is appropriate for their reading levels, otherwise they may have too much or too little to consider when thinking about their struggles to understand the material.



# Vocabulary Strategies to Activate Knowledge in Science *(cont.)*

## Semantic Word Map

### Background Information

The Semantic Word Map allows students to explore their knowledge of a new word by creating a map using other related words or phrases similar in meaning to the new word. Semantic mapping (Heimlich and Pittelman 1986 as cited by Ryder and Graves 2003) is a form of intensive instruction that is appropriate for science selections that have a single central concept and students who have fairly substantial prior knowledge about the central concept. This vocabulary technique allows students to acquire a clearer definition of a science concept by learning the connections among several related words. Emphasizing the interconnectedness of vocabulary words is an effective teaching strategy for vocabulary, according to Nagy and Scott (2000), because it taps into the way individuals store information in their brains. Furthermore, this strategy enhances vocabulary development by helping students link new information with previous experience. The activity can be used before reading to assess and build upon prior knowledge about a concept. The students can add additional information to their Semantic Word Maps after reading. The Semantic Word Map can also serve as a review tool at the end of a lesson or unit.

### Grade Levels/Standards Addressed

Grades 1–2 (Standard 7.4)
Grades 3–5 (Standard 7.6)
Grades 6–8 (Standard 7.4)

### Activity

Determine the central concept in a science reading selection prior to assigning it to the students. It is important to think about important related ideas, events, characteristics, and examples to effectively prepare for a healthy discussion. After introducing the concept to students, ask them to brainstorm words relating to the concept. Record their ideas on the board. Expand the discussion around the words that suggest larger related categories, ideas, events, characteristics, and examples. Point out those words on the list that are likely to be most useful for organizing the main concept. Have students work independently to determine which words belong under the appropriate categories. Once students have completed their Semantic Word Maps (page 59), allow them to present them and explain their reasons for choosing each word for the appropriate category.

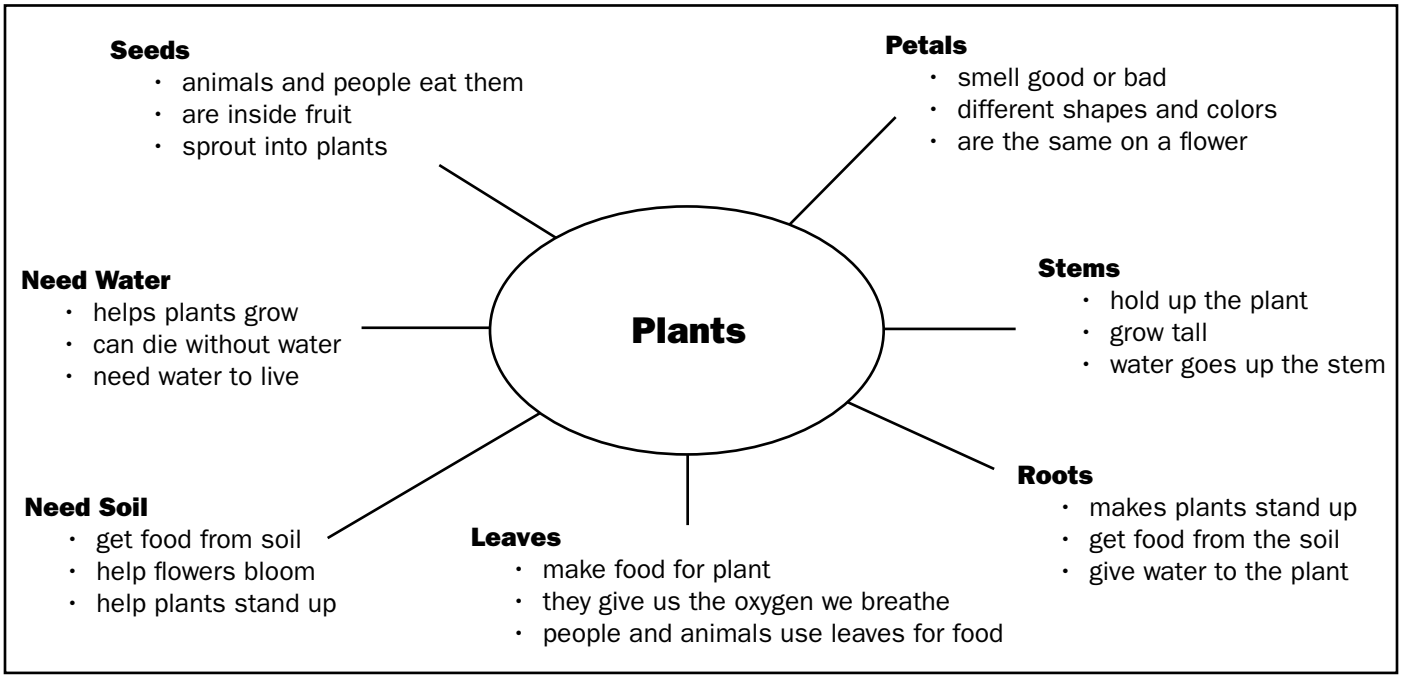
### Differentiation

ELL students will benefit from working in small, cooperative-learning groups for this activity. Working in groups will allow the students to discuss the reasons for their decisions, which encourages more active participation and engagement in the activity. Gifted students should be encouraged to explore larger related categories that interest them in more depth. If working in groups, gifted students can take the role of mediator in the decision-making process. Students below grade level should be encouraged to summarize the information on the graphic organizer for the entire class when the discussion is completed.

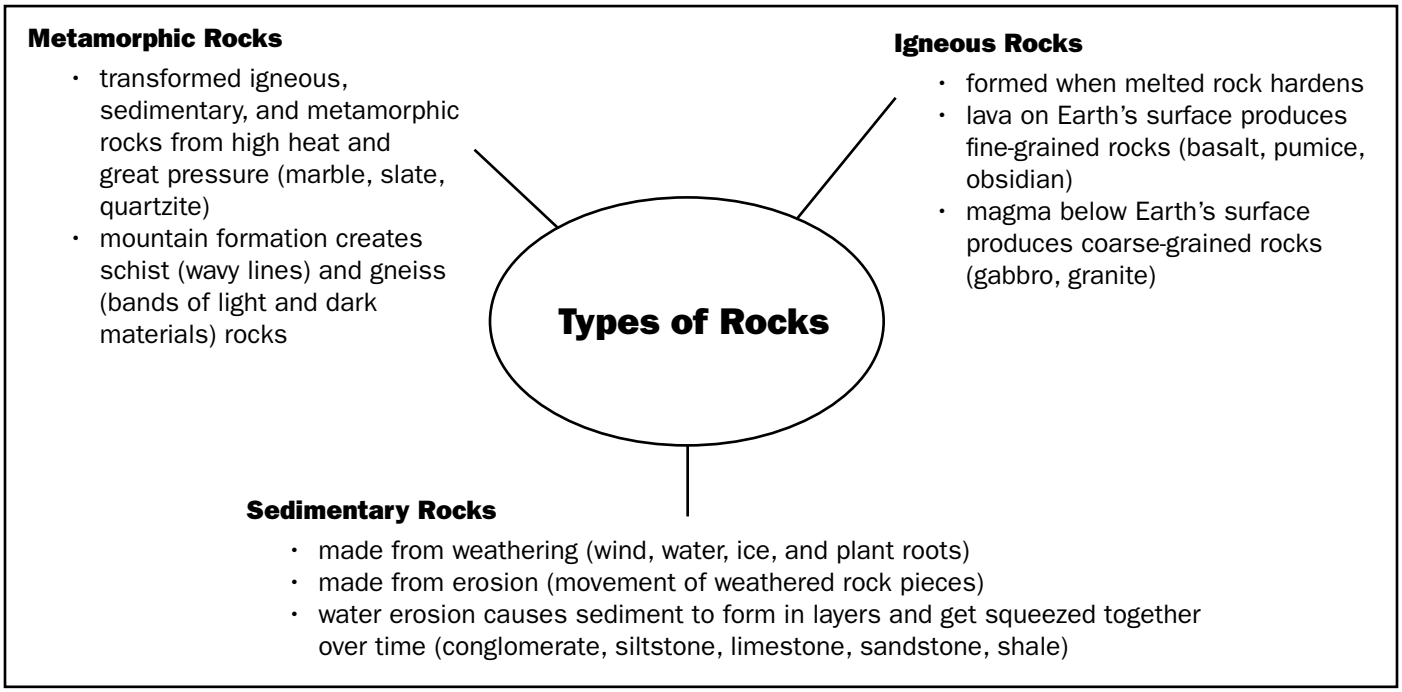
# Vocabulary Strategies to Activate Knowledge in Science *(cont.)*

## Semantic Word Map *(cont.)*

### Grades 1–2 Example



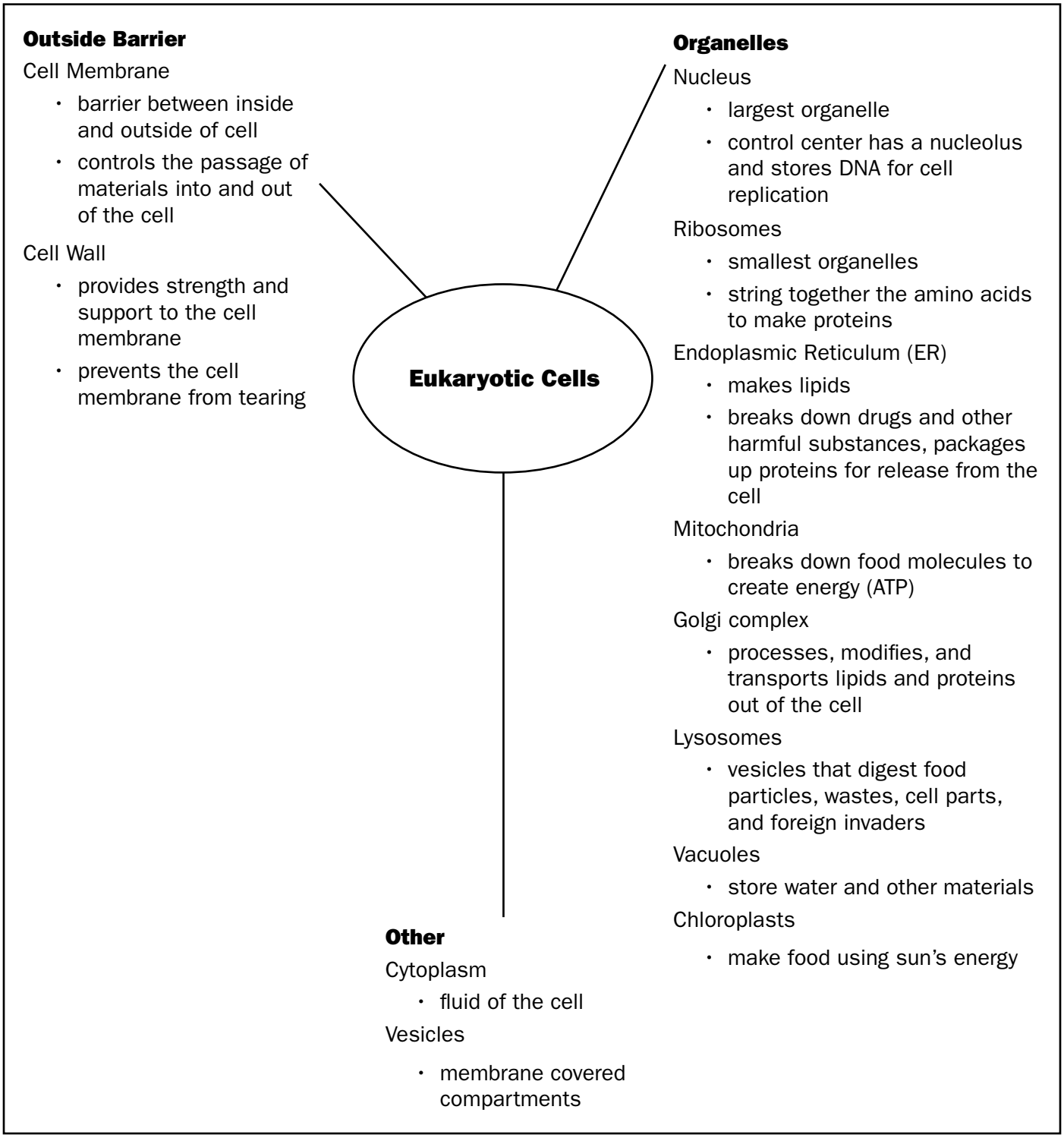

### Grades 3–5 Example



# Vocabulary Strategies to Activate Knowledge in Science *(cont.)*

## Semantic Word Map *(cont.)*

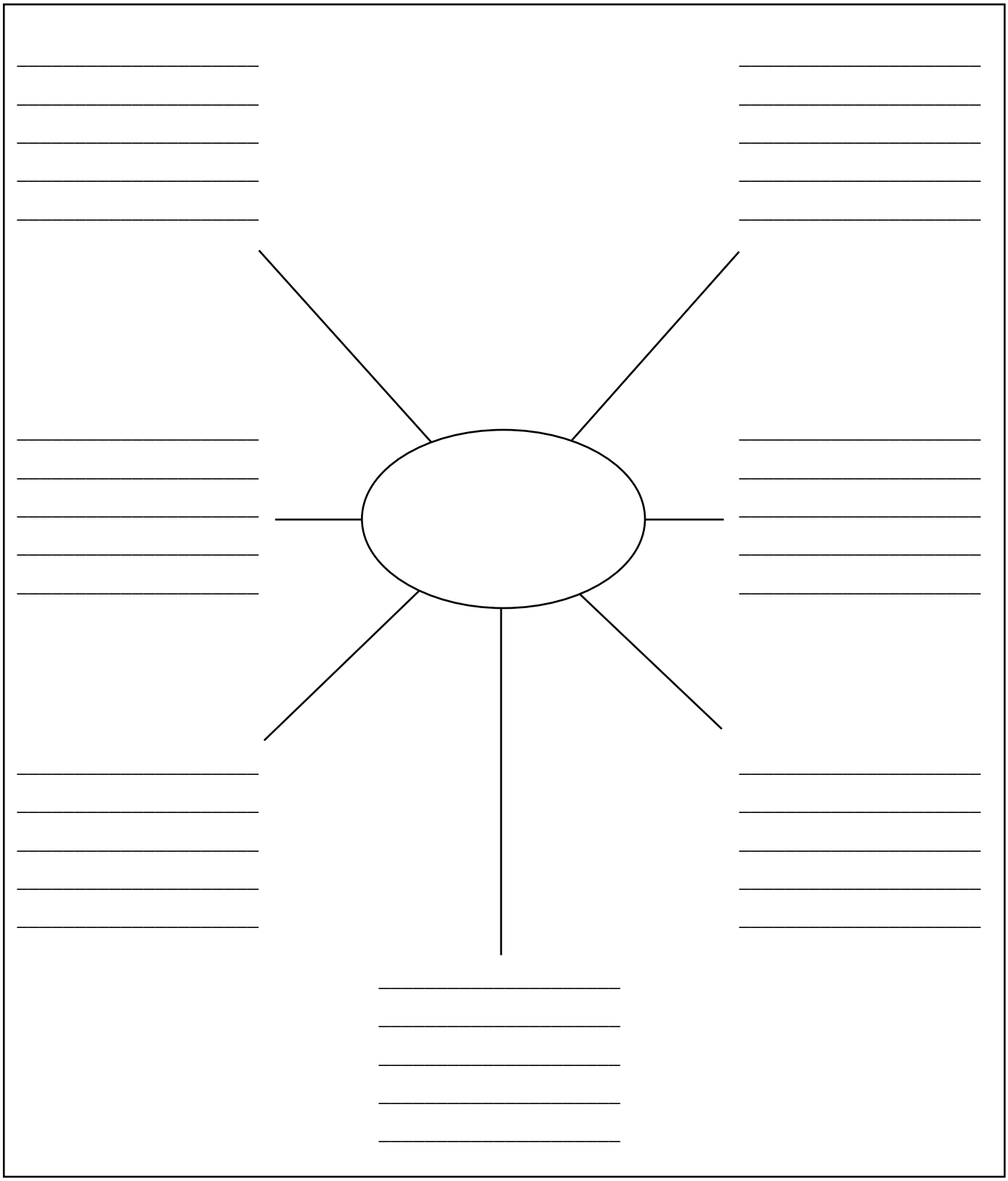
### Grades 6–8 Example



**Name:** _____

# Semantic Word Map



# Read-Retell-Record

An Active Reading Strategy for Small Leveled Groups

Preparation:

❖Group students into groups of three based on reading level and determine the appropriate leveled text for each group.

❖Create a "reading card" for each group (this can colored index card or bookmark).

Procedures:

❖Explain the strategy and roles to the class. Model the strategy using two students and yourself to demonstrate the three roles.

❖Be sure to mention that the group needs to discuss the "big idea" and reach consensus before it can be recorded.

| | |
|---|---|
| Role 1: | Read one sentence or paragraph aloud to your group. |
| Role 2: | Retell the "big idea" in your own words. |
| Role 3: | Record the big idea on a sticky note. |

❖Students then rotate the jobs and repeat the process until they've completed the portion of leveled text you've assigned.

❖When finished, students should read all of their sticky notes in order to summarize what they have read.


# Diagramming and Mapping Strategies for Science *(cont.)*

## Venn Diagram

### Background Information

The Venn Diagram (Venn 1880) compares and contrasts two items, terms, or concepts. In the science classroom, the Venn Diagram is especially useful in helping students articulate and write about what they are learning in a manner that visually illustrates similarities and differences. Using the Venn Diagram also requires students to write descriptions in their own words and to condense and summarize their statements. It is also a useful prewriting strategy because it organizes the information, so students can begin writing an effective draft.

### Grade Levels/Standards Addressed

Grades 1–2 (Standard 1.1, 4.2)
Grades 3–5 (Standard 1.1, 4.7)
Grades 6–8 (Standard 1.1, 4.5)

### Genres

Expository

### Stages of Writing Process

Prewrite

### Activity

Select two science concepts to compare and contrast. Begin by telling students that they will organize information using a graphic organizer called a Venn Diagram to compare and contrast two topics or concepts. Distribute copies of the Venn Diagram (page 115) and emphasize that similarities are listed in the center and differences are listed in the outer sections of the circles. Have students write the concepts at the top of each circle and discuss these two concepts to activate prior knowledge about their similarities and differences.

As students read the selected text, instruct them to look for information to include on their diagrams. List the unique characteristics and attributes of each concept in the appropriate outer sections and the commonalities in the center section.

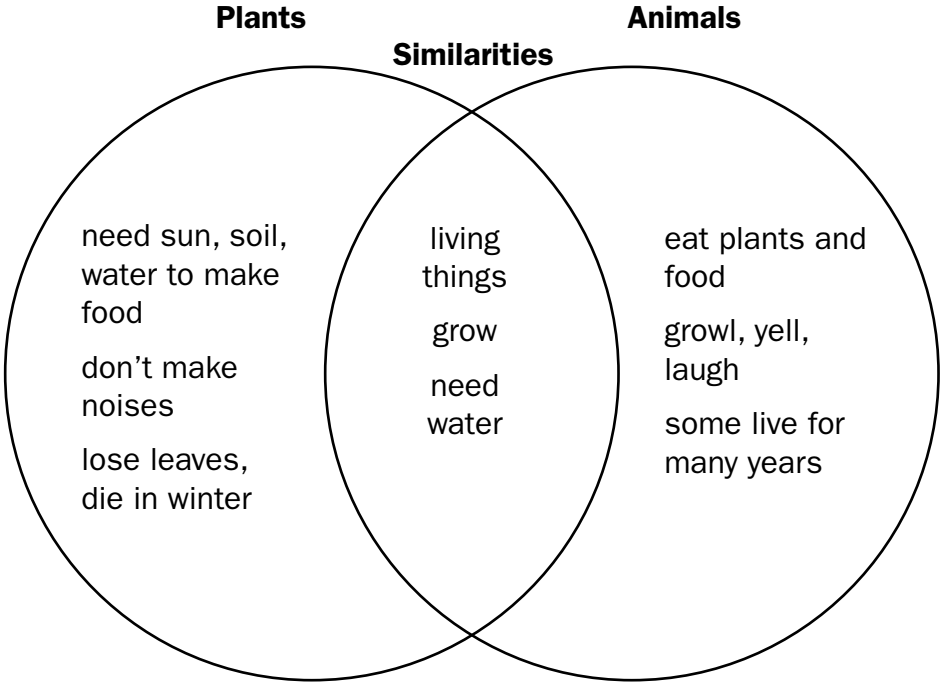
### Differentiation

Scaffold the Venn Diagram for ELLs by listing some of the characteristics. Provide a few examples to get them started and to clarify what you are looking for in this assignment. Instruct gifted students to complete the Venn Diagram without any discussion or support from the text. Have those students verify their characteristics and attributes with reading after they have completed the Venn Diagram. When finished, gifted students can then write a compare/contrast essay using the notes they recorded on the Venn diagram. Allow students who read and write below grade level to work with a partner or small group.

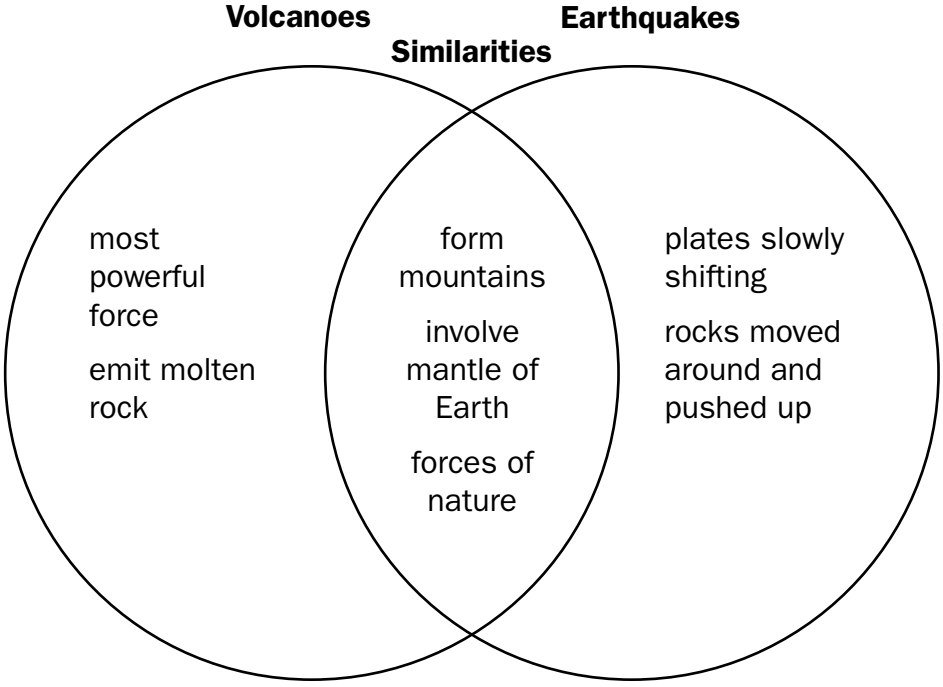
# Diagramming and Mapping Strategies for Science *(cont.)*

## Venn Diagram *(cont.)*

### Grades 1–2 Example



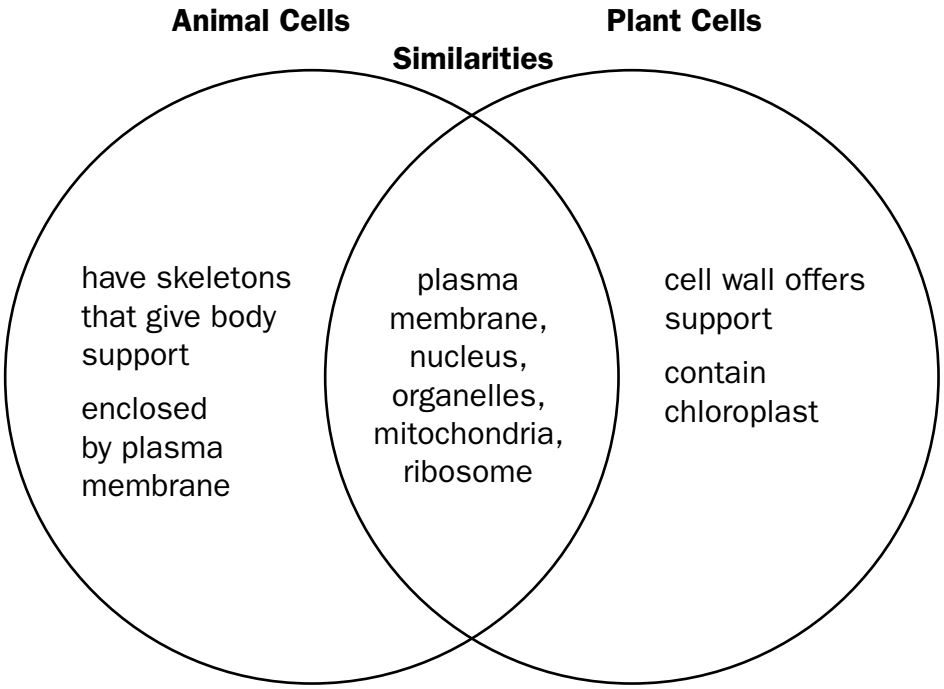

### Grades 3–5 Example



# Diagramming and Mapping Strategies for Science *(cont.)*

## Venn Diagram *(cont.)*

### Grades 6–8 Example

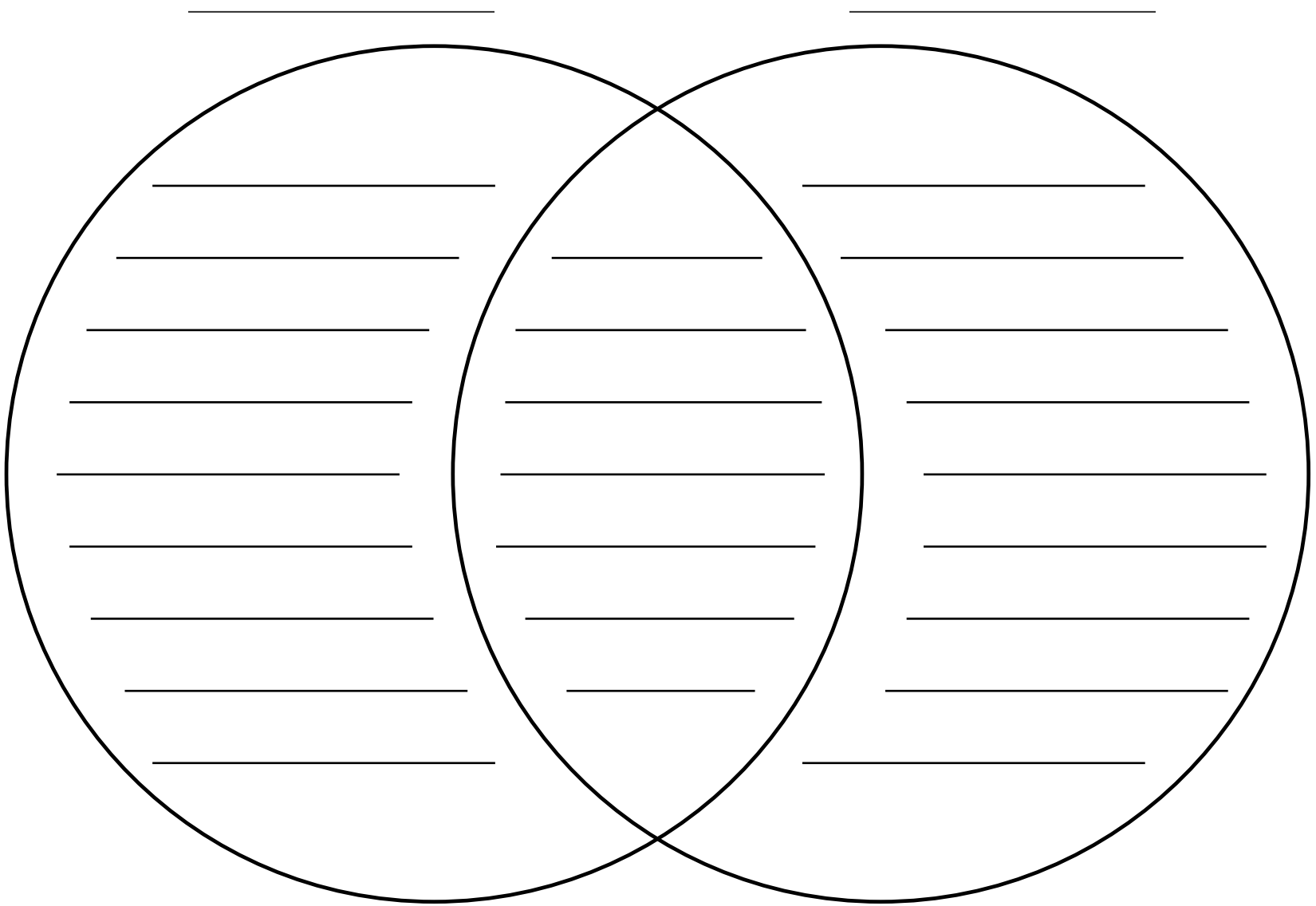


**Name:** _____

# Venn Diagram

**Directions:** Write on the top two lines the concepts you are comparing and contrasting. List the ways in which they are similar in the center section of the Venn Diagram. Write the ways they are unique in the outer sections of the circles.



# Flexible Grouping *(cont.)*

## Homogeneous Grouping

Homogeneous grouping brings together students who have the same ability levels. One way to place students in homogeneous groups is by taking Strickland's ranking model (page 33) and implementing it to group students in a different way. Notice that students 1–3 have similar ability levels. Grouping them together would be creating a homogeneous group. Students on each horizontal row share the same ability level, which creates homogeneous groups within the entire classroom.

There are many opportunities to group students homogeneously. It makes sense to use homogeneous groups when organizing reading circles so students will challenge one another to improve their reading abilities without having them feel intimidated by more advanced readers. It also makes sense to use homogeneous groups when working on math or language skills. Some students are ready to move on and learn more difficult concepts. Others need the skills reinforced. And some students are moving along at an average pace. If a teacher always teaches to the average student, the high-ability students and the struggling students will not learn anything new.

### Buddy Studies

Buddy studies is one type of homogeneous grouping strategy. A buddy study allows a small number of students (usually two or three) to work together on a given topic or project. All students take responsibility for researching and sharing information, but each individual student's assessment is based on his or her own learning. Buddy studies is a versatile strategy that can be used with almost any activity in a classroom including spelling activities, vocabulary words, science projects, math activity sheets, and social studies simulations.

## Flexogeneous Grouping

Andi Stix (2000) coined the term *flexogeneous groups*. Flexogeneous grouping allows for the flexible grouping of homogeneous and heterogeneous groups within the same lesson. It involves the students switching groups at least one time to create another group during the lesson. For example, the homogeneous group meets for half the lesson, and then they switch and form heterogeneous groups for the remainder of the lesson.

One easy flexogeneous grouping strategy is to jigsaw or mix up already established homogeneous groups. To jigsaw groups, allow one homogeneous group of students to work together for part of the lesson. Then, distinguish group members by labeling them A, B, C, and D within the same group. All the A's form a new group, the B's form a new group, the C's form a new group, and the D's form a new group. In effect, the students from each group are combined with new members to form new heterogeneous groups.

# Flexible Grouping *(cont.)*

## Flexogeneous Grouping *(cont.)*

One way to utilize flexogeneous grouping is to have reading circles grouped homogeneously. Each group will read a selection according to ability level. Then, the groups can be jigsawed into heterogeneous groups and each member will tell the group about his or her reading selection. This can also be done using primary source documents, selected textbook readings, science topics, historical events, current events, and photographs or pictures.

Why is flexogeneous grouping valuable? Flexogeneous grouping allows for all students to become experts. According to the National Academy of Science (1996), as students acquire and share knowledge about a topic, they are more likely to remember it. As a result, self-esteem in all students improves. Students also get the chance to know their classmates better as they participate in these flexogeneous groups.

## Management of Flexible Groups

Some teachers worry that not all students will participate in group work. Some shy students might feel intimidated while participating in groups. On the other hand, some students like to run the show. They talk too much and too often and do not listen to others in the group. How can teachers make sure everyone participates and listens effectively? Michael Ford (2001) has some ideas to ensure that all students get opportunities to participate and be heard while working in small groups. He says teachers first need to teach social skills to students by demonstrating proper behaviors and role-playing with students. Another way to help students be aware of their group interactions is by using student-led group evaluations. After students work in groups, have them evaluate how they worked together. Using index cards, students write what their groups did best on one side and what their groups could do to improve on the other side. These can be shared aloud with the whole class so that all students can gather ideas for working more effectively in groups.

Within homogeneous, heterogeneous, or flexogeneous grouping, teachers can create effective groups. They can create pairs (2 students each), small groups (3–5 students each), collaborative groups (6–8 students each), and teams (2 or 4 groups per class).

Ford (2001) describes several concrete strategies that teachers can use to help students monitor their participation in flexible groups. Distribute four different task cards to each student. Each task card reminds students to ask questions, share opinions, make comments, or compliment others on contributions to the group. As students fulfill tasks, they turn over the appropriate cards to show they have contributed to the group in specific ways.