



Dr. Carl A. Montoya  
Superintendent

# Brownsville Independent School District

## DEPARTMENT of CURRICULUM & INSTRUCTION

1900 Price Road \* Brownsville, Texas 78521 \* Ph: (956) 548-8121 \* Fax: (956) 548-8167

**PURPOSE:** *TLI Strategies Make and Take*

**AUDIENCE:** \*PK – 12 Teachers trained in TLI Strategies

**DATE:** Saturday, September 7, 2013

**LOCATION:** Individual Campuses

**Time:** 8:30 a.m. – 11:30 a.m.

**SRN:** 001130953  
*½ day \$75 stipend to \*eligible teachers*

*Submit in-house professional leaves to the TLI Office and include the SRN # on the top of the form.*

*Please contact Maria V. Gonzales, TLI Director, at 698-1650 or your campus TLI Teacher Specialist for any questions.*

### **TEXAS LITERACY INITIATIVE (TLI) GRANT GOALS**

1. **Increase** the oral language and preliteracy skills of participating **preschool children**.
2. **Improve** the performance of participating **K-2 students** on early reading assessments.
3. **Increase** the percentage of participating students who meet or exceed proficiency on the state English language arts assessments in grades **3 through 12**.
4. **Increase** the use of data and data analysis to inform all decision making in participating districts, campuses, classrooms, and early learning settings.
5. **Increase** the implementation of effective literacy instruction through *Literacy Lines*.



Dr. Carl A. Montoya,  
Superintendent of Schools

# Brownsville Independent School District Curriculum & Instruction Department/ TLI Office

September 7, 2013

8:30 – 11:30 a.m.

SRN 001130953

Location: Hanna High School



TEXAS LITERACY INITIATIVE  
LINE UP THE FUTURE

## TLI Strategies/Routines Make and Take Share Fair

### A G E N D A

Time	Resource	Description	Presenter(s)
120 minutes	AGENDA  PROJECT SHARE RESOURCES	<p>I. WELCOME/AGENDA</p> <p>II. Overview of Workstations and Focus Activities</p> <p>A. CPQ's for ELA or planning in other content areas;</p> <p>B. Vocabulary and Frayer model charts and activities;</p> <p>C. Anchor lessons; Visuals for Classroom Evidence;</p> <p>D. Cognitive Strategy Routine passages for content areas;</p> <p>E. Lesson plans with TLI strategies/routines integrated;</p> <p>F. CPQ Strategy Strip;</p> <p>G. Writing Focus;</p> <p>H. Other: _____</p> <p>III. Wrap Up and Sign Out</p>	<p><i>Sonia Villalón</i></p> <p>TLI Teacher Specialist</p>

#### NOTES GUIDE:

<ul style="list-style-type: none"> <li>• What are the <u>connections</u> to my work?</li> <li>• Who else in my campus needs this information?</li> <li>• What follow up or actions will be needed?</li> </ul>	<ul style="list-style-type: none"> <li>• What other resources are available?</li> <li>• Purposeful duplication: Where else will this information be <u>shared</u>?</li> </ul>
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#### TEXAS LITERACY INITIATIVE (TLI) GRANT GOALS \*\*\* METAS DE LA INICIATIVA DE CAPACIDAD DE LEER Y ESCRIBIR DE TEJAS

<ol style="list-style-type: none"> <li>1. <b>Increase</b> the oral language and preliteracy skills of participating <b>preschool children</b>.</li> <li>2. <b>Improve</b> the performance of participating <b>K-2 students</b> on early reading assessments.</li> <li>3. <b>Increase</b> the percentage of participating students who meet or exceed proficiency on the state English language arts assessments in grades <b>3 through 12</b>.</li> <li>4. <b>Increase</b> the use of data and data analysis to inform all decision making in participating districts, campuses, classrooms, and early learning settings.</li> <li>5. <b>Increase</b> the implementation of effective literacy instruction through <i>Literacy Lines</i>.</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>Incrementar</b> la expresión oral y las habilidades de pre-alfabetización en niños de <b>preescolar</b> participantes.</li> <li>2. <b>Mejorar</b> el desempeño de los <b>alumnos de K-2</b> participantes en las evaluaciones de lectura prematura.</li> <li>3. <b>Incrementar</b> el porcentaje de alumnos participantes que logren o excedan el dominio del idioma inglés en las evaluaciones del estado en artes del lenguaje, desde el <b>tercero al doceavo grado</b>.</li> <li>4. <b>Incrementar</b> el uso y análisis a base de datos para informar a los distritos participantes, escuelas, aulas y espacios de aprendizaje preescolar de toda toma de decisiones.</li> <li>5. <b>Incrementar</b> la aplicación de la alfabetización efectiva a través de Líneas de comunicación de instrucción .</li> </ol>
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ASK

**CPOQ**



Think

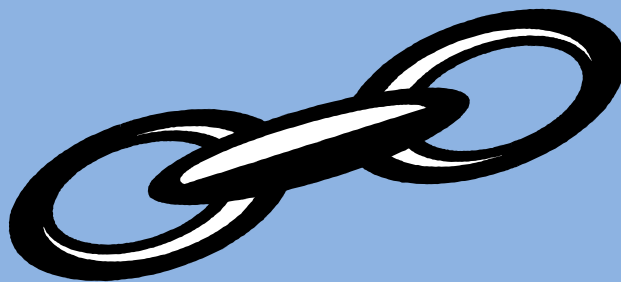


Turn



Talk

**Making Connections**



# Creating Mental Images



# Making Inferences & Predictions



# Asking & Answering Questions





# Determining Importance & Summarizing

# Monitoring & Clarifying



**ANSWER**

# CPQ



PORTER LITERACY LINE



TEXAS  
LITERACY INITIATIVE  
LINE UP THE FUTURE



## Steps for Setting a Great CPQ

1. Record/annotate your thinking while reading the text you will ask students to read.
2. Use sticky notes to record your thinking.
3. Think about what you would want students to understand after reading the article.
4. Create a “Great” CPQ.





# Going From Good to Great!

## A good CPQ:

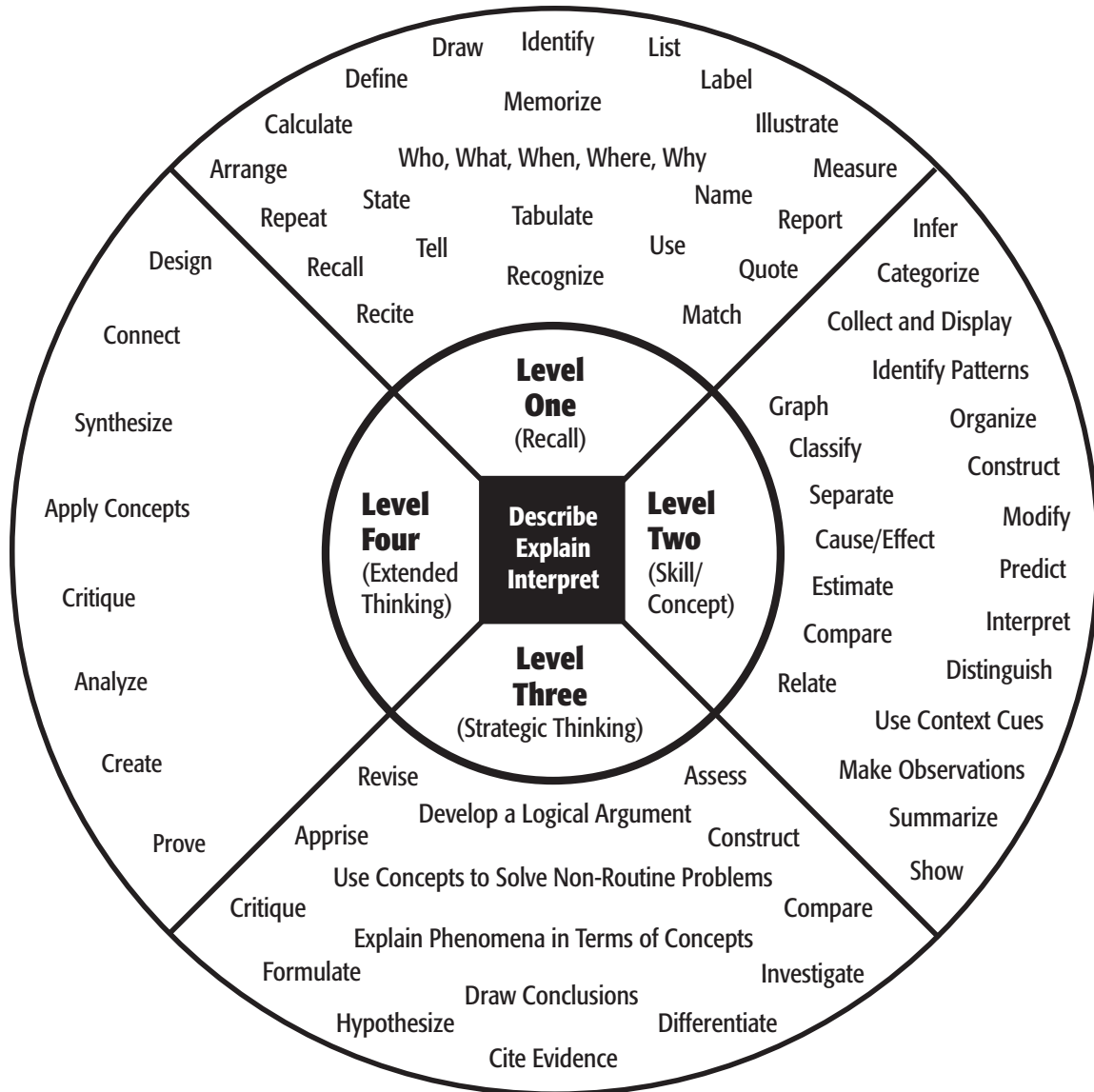
- Is answered in the text either explicitly or implicitly.
- Involves student thinking.
- Will focus on comprehension.
- Relates to student learning.

## A great CPQ:

- Cannot be completely answered until students have read the entire text.
- Involves higher order thinking, inferences, text evidence or synthesis of information.
- Will deepen and extend comprehension. Gets at the heart of what you want students to understand.
- Relates to the cognitive strategy(ies) currently being taught.



# Depth of Knowledge (DOK) Levels



Level One Activities	Level Two Activities	Level Three Activities	Level Four Activities
Recall elements and details of story structure, such as sequence of events, character, plot and setting.	Identify and summarize the major events in a narrative.	Support ideas with details and examples.	Conduct a project that requires specifying a problem, designing and conducting an experiment, analyzing its data, and reporting results/solutions.
Conduct basic mathematical calculations.	Use context cues to identify the meaning of unfamiliar words.	Use voice appropriate to the purpose and audience.	Apply mathematical model to illuminate a problem or situation.
Label locations on a map.	Solve routine multiple-step problems.	Identify research questions and design investigations for a scientific problem.	Analyze and synthesize information from multiple sources.
Represent in words or diagrams a scientific concept or relationship.	Describe the cause/effect of a particular event.	Develop a scientific model for a complex situation.	Describe and illustrate how common themes are found across texts from different cultures.
Perform routine procedures like measuring length or using punctuation marks correctly.	Identify patterns in events or behavior.	Determine the author's purpose and describe how it affects the interpretation of a reading selection.	Design a mathematical model to inform and solve a practical or abstract situation.
Describe the features of a place or people.	Formulate a routine problem given data and conditions.	Apply a concept in other contexts.	
	Organize, represent and interpret data.		



# DOK Question Stems

<p><b>DOK 1</b></p> <ul style="list-style-type: none"> <li>• Can you recall ____?</li> <li>• When did ____ happen?</li> <li>• Who was ____?</li> <li>• How can you recognize ____?</li> <li>• What is ____?</li> <li>• How can you find the meaning of ____?</li> <li>• Can you recall ____?</li> <li>• Can you select ____?</li> <li>• How would you write ____?</li> <li>• What might you include on a list about ____?</li> <li>• Who discovered ____?</li> <li>• What is the formula for ____?</li> <li>• Can you identify ____?</li> <li>• How would you describe ____?</li> </ul>	<p><b>DOK 2</b></p> <ul style="list-style-type: none"> <li>• Can you explain how ____ affected ____?</li> <li>• How would you apply what you learned to develop ____?</li> <li>• How would you compare ____?</li> <li>• Contrast ____?</li> <li>• How would you classify ____?</li> <li>• How are ____ alike? Different?</li> <li>• How would you classify the type of ____?</li> <li>• What can you say about ____?</li> <li>• How would you summarize ____?</li> <li>• How would you summarize ____?</li> <li>• What steps are needed to edit ____?</li> <li>• When would you use an outline to ____?</li> <li>• How would you estimate ____?</li> <li>• How could you organize ____?</li> <li>• What would you use to classify ____?</li> <li>• What do you notice about ____?</li> </ul>
<p><b>DOK 3</b></p> <ul style="list-style-type: none"> <li>• How is ____ related to ____?</li> <li>• What conclusions can you draw ____?</li> <li>• How would you adapt ____ to create a different ____?</li> <li>• How would you test ____?</li> <li>• Can you predict the outcome if ____?</li> <li>• What is the best answer? Why?</li> <li>• What conclusion can be drawn from these three texts?</li> <li>• What is your interpretation of this text? Support your rationale.</li> <li>• How would you describe the sequence of ____?</li> <li>• What facts would you select to support ____?</li> <li>• Can you elaborate on the reason ____?</li> <li>• What would happen if ____?</li> <li>• Can you formulate a theory for ____?</li> <li>• How would you test ____?</li> <li>• Can you elaborate on the reason ____?</li> </ul>	<p><b>DOK 4</b></p> <ul style="list-style-type: none"> <li>• Write a thesis, drawing conclusions from multiple sources.</li> <li>• Design and conduct an experiment. Gather information to develop alternative explanations for the results of an experiment.</li> <li>• Write a research paper on a topic.</li> <li>• Apply information from one text to another text to develop a persuasive argument.</li> <li>• What information can you gather to support your idea about ____?</li> <li>• DOK 4 would most likely be the writing of a research paper or applying information from one text to another text to develop a persuasive argument.</li> <li>• DOK 4 requires time for extended thinking.</li> </ul>

<p style="text-align: center;"><b>Depth of Knowledge –Level 3</b></p> <p>Students provide support for reasoning, apply complex and abstract thinking, and make decisions.</p>	<p style="text-align: center;"><b>Depth of Knowledge –Level 4</b></p> <p>Students make connections, related ideas within the content or among content areas, and devise one approach among alternatives on how a situation can be solved.</p>
<p style="text-align: center;"><b>Engagement Prompts</b></p> <p>What makes ____ better than/superior to ____?          Explain or connect ideas using supporting evidence to ____.          Analyze/synthesize information within one data source or text.          What is the recurring theme in ____?          Provide supporting details. Support your rationale.          Evaluate and provide rationale.          Verify the reasonableness of ____.          What is your interpretation of ____?          Cite evidence and develop a logical argument for ____.          How is ____ related to ____?          How would you adapt ____ to ____?          How would your test ____?          What would happen if ____?</p>	<p style="text-align: center;"><b>Engagement Prompts</b></p> <p>Investigate and draw conclusions about how ____ impacts the world today.          How would you adapt ____ to create ____ that would be applicable in the real world?          Analyze and explain multiple perspectives/issues within or across time periods, events, or cultures.          Analyze how similar themes or ideas are developed in multiple texts.          Evaluate for real-world occurrence.          Design ____ to improve ____.          Justify your choice.          Gather, organize, and interpret information from multiple sources.          Write a research report.</p>
<p style="text-align: center;"><b>Strategic thinking</b></p> <p>DOK Level 3 requires higher cognitive demands than the previous levels. Students explain/justify thinking and provide supporting evidence for reasoning or conclusions drawn. Level 3 tasks typically require reasoning, complexity, developing a plan or sequence of steps, and have more than one possible response or solution.</p>	<p style="text-align: center;"><b>Extended thinking</b></p> <p>DOK Level 4 requires complex reasoning and time to research, plan, and problem solve, and think. Tasks involve investigation or application to the real world and include none-routine manipulations or connections with and across discipline, content areas, and multiple sources. Students select one approach among many alternatives. Tasks usually occur over an extended period of time</p>

\*From Dept-of –knowledge Levels for Four Content Areas by Webb, N.

<p style="text-align: center;"><b>Revised Bloom's Taxonomy Level 4 Apply</b></p> <p>The student makes use of information in a context different from the one in which it was learned.</p>	<p style="text-align: center;"><b>Revised Bloom's Taxonomy Level 5 Analyze</b></p> <p>The student breaks learned information into parts to explore understandings and relationships.</p>	<p style="text-align: center;"><b>Revised Bloom's Taxonomy Level 6 Create</b></p> <p>The student creates new ideas, products, or viewpoints from previously learned information.</p>										
<p style="text-align: center;"><b>Engagement Prompts</b></p> <p>Which other way would you choose to _____?</p> <p>Use other attributes/characteristics to group/sort _____.</p> <p>Explain another situation where _____.</p> <p>Which factors would you change if _____?</p> <p>What questions would you ask of _____?</p> <p>Which actions would you take if _____?</p> <p>What would the result be if _____?</p> <p>Why does _____ Work?</p>	<p style="text-align: center;"><b>Engagement Prompts</b></p> <p>Determine if the information is based on fact or opinion.</p> <p>Explain what must have happened when _____.</p> <p>What conclusions can you draw _____?</p> <p>Which events could not have happened?</p> <p>What is similar to or different from _____?</p> <p>What is the motive/underlying them/message _____?</p> <p>What are other possible outcomes?</p> <p>Distinguish between _____.</p> <p>What is the relationship _____?</p>	<p style="text-align: center;"><b>Engagement Prompts</b></p> <p>What changes could you make to revise _____?</p> <p>What theory can you propose for _____?</p> <p>Develop a plan/proposal that _____?</p> <p>What might be a solution to _____?</p> <p>How many ways can you _____?</p> <p>How could you improve _____?</p> <p>Devise your own way to _____.</p> <p>What might happen if _____?</p> <p>Generate hypotheses _____.</p> <p>What are the alternatives?</p> <p>Design a _____ to _____.</p>										
<p style="text-align: center;"><b>Apply (level 4)</b></p> <p>Carry out or use a procedure in a given situation</p>	<p style="text-align: center;"><b>Analyze (level 5)</b></p> <p>Break down a concept or idea into parts and determine the relationships among the parts.</p>	<p style="text-align: center;"><b>Create (Level 6)</b></p> <p>Combine elements or ideas to form a whole; reorganized elements or ideas into new patterns or structures.</p>										
<p style="text-align: center;"><b>Cognitive Processes</b></p> <p style="text-align: center;">Carrying out Executing Implementing Using</p>	<p style="text-align: center;"><b>Cognitive Processes</b></p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Differentiation</td> <td style="text-align: center;">Discrimination</td> </tr> <tr> <td style="text-align: center;">Distinguishing</td> <td style="text-align: center;">Finding Coherence</td> </tr> <tr> <td style="text-align: center;">Focusing</td> <td style="text-align: center;">Integrating</td> </tr> <tr> <td style="text-align: center;">Attributing</td> <td style="text-align: center;">Deconstruction</td> </tr> <tr> <td style="text-align: center;">Outlining</td> <td style="text-align: center;">Organizing</td> </tr> </table>	Differentiation	Discrimination	Distinguishing	Finding Coherence	Focusing	Integrating	Attributing	Deconstruction	Outlining	Organizing	<p style="text-align: center;"><b>Cognitive Processes</b></p> <p style="text-align: center;">Construction Hypothesizing Designing Planning Generating Producing</p>
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\*From Dept-of –knowledge Levels for Four Content Areas by Webb, N.



TEXAS LITERACY INITIATIVE



# Making Connections

## Grades 6-12





# Introducing Cognitive Strategies

## Strategy Instruction

### Direct – Explicit – Systematic

#### Gradual Release of Responsibility

1. Use a real-world example to create a context (anchor lesson).
2. Give the strategy a name.
3. Define the strategy, how and when it is used, and how it helps with reading.
4. Give students touchstones, such as a hand gesture or icon, to help them remember the strategy.
5. Think aloud, using the strategy in a variety of contexts.
6. Engage students by providing opportunities for them to share their thinking during the reading. Practice shared application with planned discussion prompts.
7. Scaffold practice, providing opportunities for students to use the strategy while reading, with teacher support and monitoring.
8. Provide accountability measures for students while using the strategy independently.

**Ongoing Assessment** may include informal assessments such as anecdotal records, observations of class discussion, portfolios, projects, student records of thinking (post-it notes, drawings, and writings), as well as formal assessments.

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### Cognitive Strategy Lesson Planning

Title of Text \_\_\_\_\_ 

<b>Step 1</b> Use a real-world example to create a context.	Anchor lesson:
<b>Step 2</b> Give the strategy a name.	"Today, we are going to learn a strategy called _____."
<b>Step 3</b> Define the strategy, how and when it is used, and how it helps with reading.	Strategy definition:  How it helps us comprehend:
<b>Step 4</b> Give students touchstones.	Model hand gesture, explain strategy poster, and refer to anchor lesson.

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# Teaching the Strategy (Steps 2-4)

Strategy Instruction		
Direct – Explicit – Systematic		
<b>Responsibility</b>	<ol style="list-style-type: none"><li>1. Use a real-world example to create a context (anchor lesson).</li><li>2. Give the strategy a name.</li><li>3. Define the strategy, how and when it is used, and how it helps with reading.</li><li>4. Give students touchstones, such as a hand gesture or icon, to help them remember the strategy.</li></ol>	<b>Ongoing Assessment</b>





## Step 1: Anchor Lesson

“Today, we are going to explore our background knowledge. Did you know that everyone has background knowledge? Background knowledge is another way for saying, ‘What I know.’ You have lots of background knowledge because you know a lot about many things. We get background knowledge from doing things, seeing things, going places, from reading, and talking with others.”









# My Background Knowledge





# Step 1: Anchor Lesson

Use a real-world example to create a context.



Record what you will do for Step 1 on your orange Cognitive Strategy Lesson Planning Card.

Cognitive Strategy Lesson Planning	
Title of Text _____	
<b>Step 1</b> Use a real-world example to create a context.	Anchor lesson: _____
<b>Step 2</b> Give the strategy a name.	"Today, we are going to learn a strategy called _____"
<b>Step 3</b> Define the strategy, how and when it is used, and how it helps with reading.	Strategy definition: _____  How it helps us comprehend: _____
<b>Step 4</b> Give students touchstones.	Model hand gesture, explain strategy poster, and refer to anchor lesson.

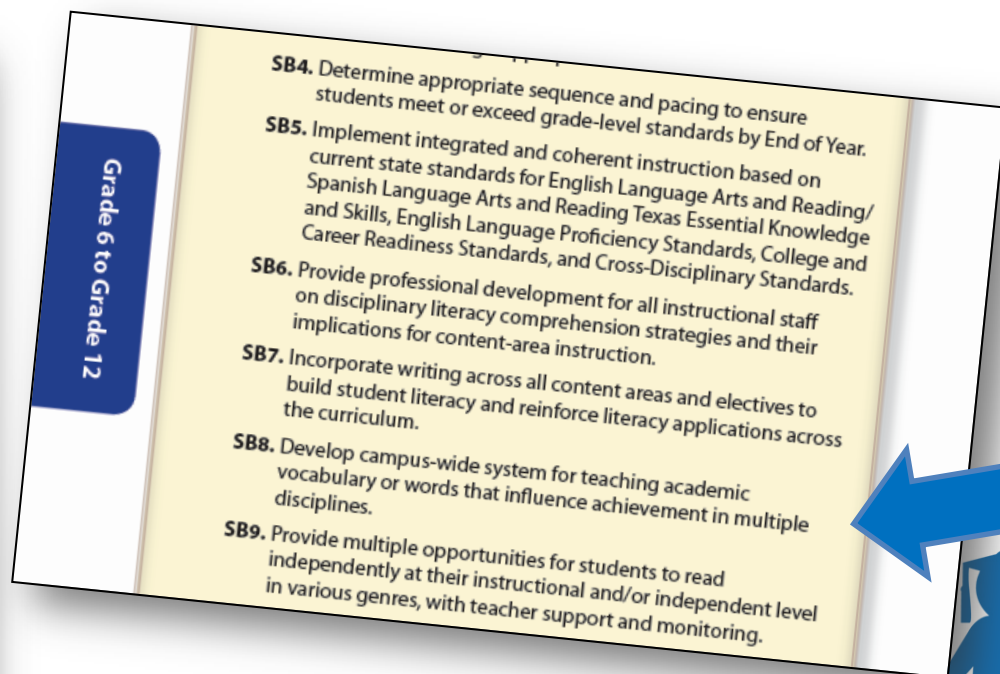
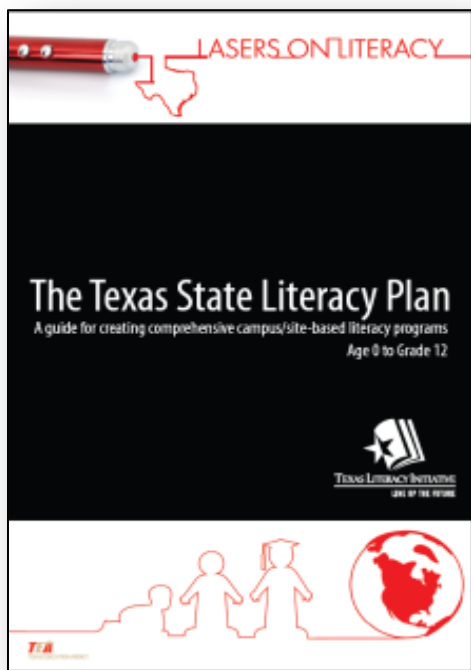
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## Step 2: Give the Strategy a Name

“Today we’re going to learn a strategy called Making Connections.”





## Step 2: Give the Strategy a Name

“Today we’re going to learn a strategy called Making Connections.”

Record what you will say for Step 2 on your orange Cognitive Strategy Lesson Planning Card.

**Cognitive Strategy Lesson Planning**

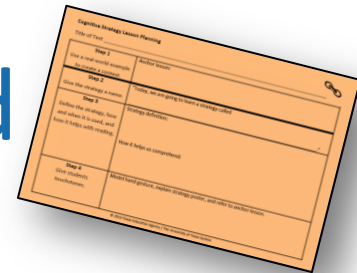
Title of Text \_\_\_\_\_

<b>Step 1</b> Use a real-world example to create a context.	Anchor lesson: _____
<b>Step 2</b> Give the strategy a name.	“Today, we are going to learn a strategy called _____”
<b>Step 3</b> Define the strategy, how and when it is used, and how it helps with reading.	Strategy definition: _____  How it helps us comprehend: _____
<b>Step 4</b> Give students touchstones.	Model hand gesture, explain strategy poster, and refer to anchor lesson.

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## Step 3: Tell Why and How it is Used



### Strategy Definition:

“We are going to learn how to use our background knowledge to help us understand what we are reading. When something in the text reminds us of something we know, we call that making a connection.”

### How it helps us understand:

“When we make connections while reading, it helps us understand and remember the text better.”





# Step 3: Tell Why and How it is Used

Record what you will say for Step 3 on your orange Cognitive Strategy Lesson Planning Card.

**Cognitive Strategy Lesson Planning**

Title of Text \_\_\_\_\_

<b>Step 1</b> Use a real-world example to create a context.	Anchor lesson: "Today, we are going to learn a strategy called _____"
<b>Step 2</b> Give the strategy a name.	Strategy definition:
<b>Step 3</b> Define the strategy, how when it is used, and how it helps with reading.	How it helps us comprehend:
<b>Step 4</b> Give students touchstones.	Model hand gesture, explain strategy poster, and refer to anchor lesson.

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Making Connections...







## Step 4: Touchstones

Provide students with a hand motion that signals “Making Connections”



Display strategy poster in the classroom





## Step 4: Touchstones

Touchstones: Model hand gesture, explain strategy poster and refer to the anchor lesson.

“See this Making Connections strategy poster? It shows a chain link. The two links are connected. This poster helps us to remember that good readers make connections when they read. Today when I am reading, I will show you when I am making a connection to the text by crossing my fingers to make them connect. Remember, a connection is when something in the text reminds us of something in our background knowledge. For example, we all have background knowledge of cars.”







## Step 4: Touchstones

Record what you will say for Step 4 on your orange Cognitive Strategy Lesson Planning Card.

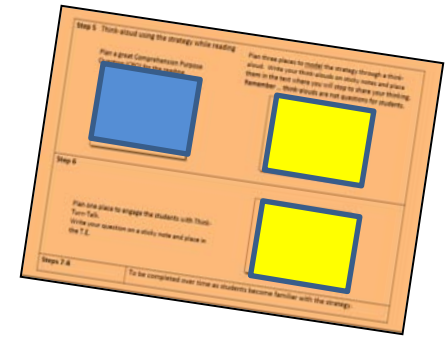
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<b>Step 4</b> Give students touchstones.	Model hand gesture, explain strategy poster, and refer to anchor lesson.  

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## Step 5: Think Aloud (Side 2)



Step 5 is where we **SHOW** students how we use the strategy while reading.

We plan a comprehension purpose question (CPQ) as well as places to model thinking aloud for students.

Step 5 will differ with each lesson. We transfer the sticky notes from the planning card and place them right on the text.





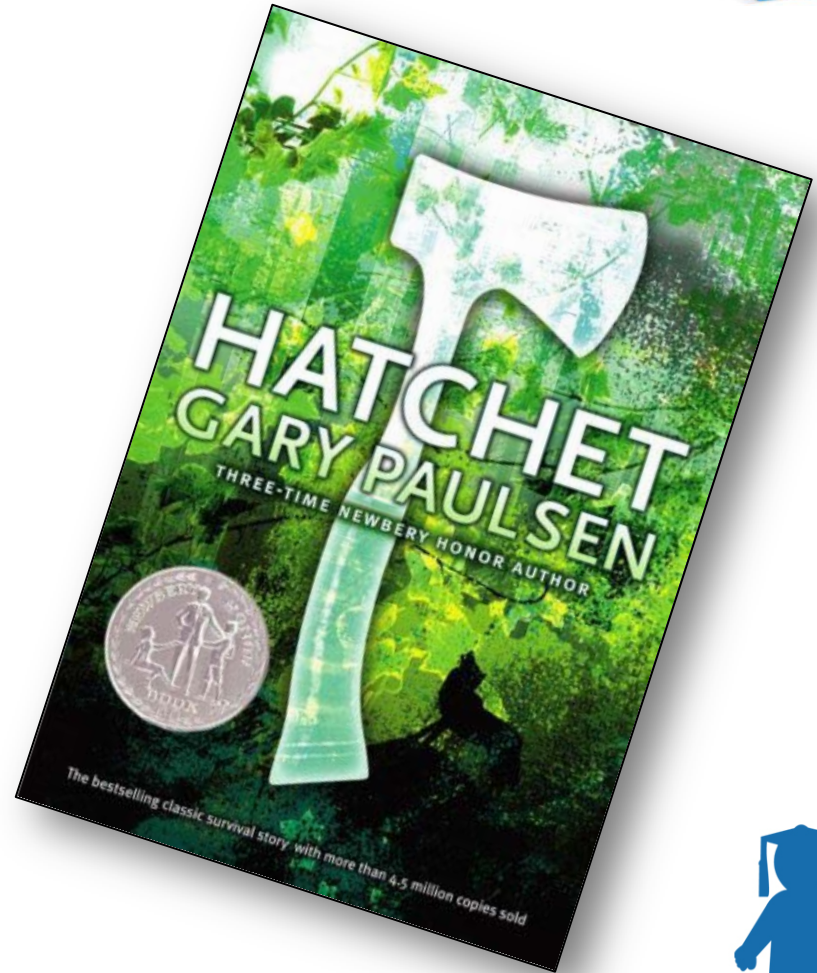
## Step 5: Think Aloud



Pages 13-29

CPQ: What does Brian do to try and help the situation.

“As we read chapter 2, I will stop and think-aloud some of the connections I make while reading.”





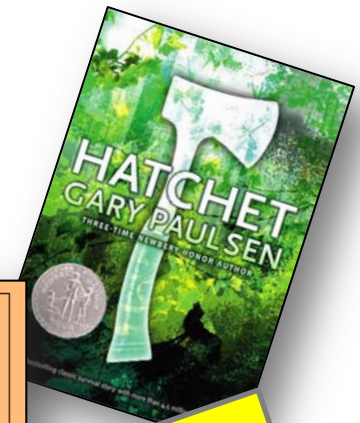
# Step 6



Engage students by providing meaningful opportunities for them to share their thinking during the reading. Practice shared application with planned discussion prompts.

p. 20. “Let’s think for a moment. How do you think Brian is feeling right now? Can you make a connection to how he’s feeling?”

Turn and talk to your partner.



<p>Step 5 Think-aloud, using the strategy in a variety of contexts while reading.</p>	
<p>Plan a great Comprehension Purpose Question (CPQ) for the reading.</p>	<p>Plan three places to model the strategy through a think-aloud. Write your think-alouds on sticky notes and place them in the text where you will stop to share your thinking. Remember: Think-alouds are not questions for students.</p>
<p>CPQ</p>	<p>Model the Strategy 3 Times</p>
<p>Step 6 Engage students by providing opportunities for them to share their thinking during reading. Practice shared application with planned discussion prompts.</p>	
<p>Plan at least one place to engage students with Think-Talk-Talk. Write your question on a sticky note and place it directly on the text.</p>	
<p>Steps 7–8</p>	<p>To be completed over time as students become familiar with the strategy.</p>





# How Can We Help Our Students Make Connections?

- Carefully preview texts and choose texts to which students can relate.
- Model authentic connections by thinking through the text yourself before reading with the students.
- Be explicit about the ways connections help you understand.
  - When modeling, use the stems, “That reminds me of ...” and “That helps me understand the text better because ...”
  - Post these stems for student reference.





## Caution



Weak readers often have difficulty understanding text because they make connections to background knowledge that is irrelevant to the reading task. When students are directly taught to integrate background knowledge with the text, however, they do better on comprehension measures.

(Hansen, 1981; Pressley, 2002)







## Step 7: Scaffolded Practice with Support

Scaffold practice, providing opportunities for students to use the strategy while reading with the teacher's support and monitoring.

“We are going to read an article in class today. As you read, I want you to be aware of the connections you make to what we've learned so far about the Earth's core. Record your connections on sticky notes and place them on the text. When you are finished reading the article, complete the 3 column chart we use for Making Connections and be prepared to share your thinking during small group discussion.”





# Step 7: Scaffolded Practice with Support



## Making Connections

Name: Emily #9

Title: Rare Rocks offer a unique glimpse of the Earth's core

What I read Page #	Connections This reminds me ... I remember ...	My connection helps me understand the text because ...
p. 1	reminds me of continental drift. Hawaii must have connected to California.	It helps me to understand why the article states that clues of the origin of Hawaii were found in California.
p. 2	At first I thought this was little but then I realized that it was bigger than a dime.	It helps me to understand the size.
p. 2	It makes me think of what we learned about plate boundaries.	It helps me to understand how slabs of oceanic crust ended up in the mountains.

**PLATE TECTONICS** Tuesday - January.22.2013

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Patent Info  
Tectonic Globe

Research > Earth's Core > [Rare Rocks Offer a Unique Glimpse Of The Earth's Core; 2002](#) Print this article

Rare Rocks Offer a Unique Glimpse Of The Earth's Core; 2002

by Mark Shwartz

Rare grains of metal from California and Oregon are providing new clues about the origin of the Hawaiian Islands -- and fueling old controversies about the evolution of the Earth's core.

In a study published in the April 19 issue of the journal Science, researchers from Stanford and the University of Copenhagen used state-of-the-art technology to measure 13 millimeter-sized grains of rock collected from slabs of oceanic crust and the lower mantle that have been pushed up on the American continental shelf in the Klamath Mountains of Northern California and Southwestern Oregon.

The samples are of particular interest to geologists because they contain large amounts of the element, osmium (Os). The element is found on the surface, osmium is believed to occur in relatively high concentrations in the lower mantle and in the lower crust.

The core is too deep for direct sampling, but the study provides tantalizing hints about its composition.

**CPQ: What might we learn about the Earth's core from studying these rare rocks?**

<http://www.platetectonics.com/article.asp?a=65&c=5>







## Step 8: Accountability

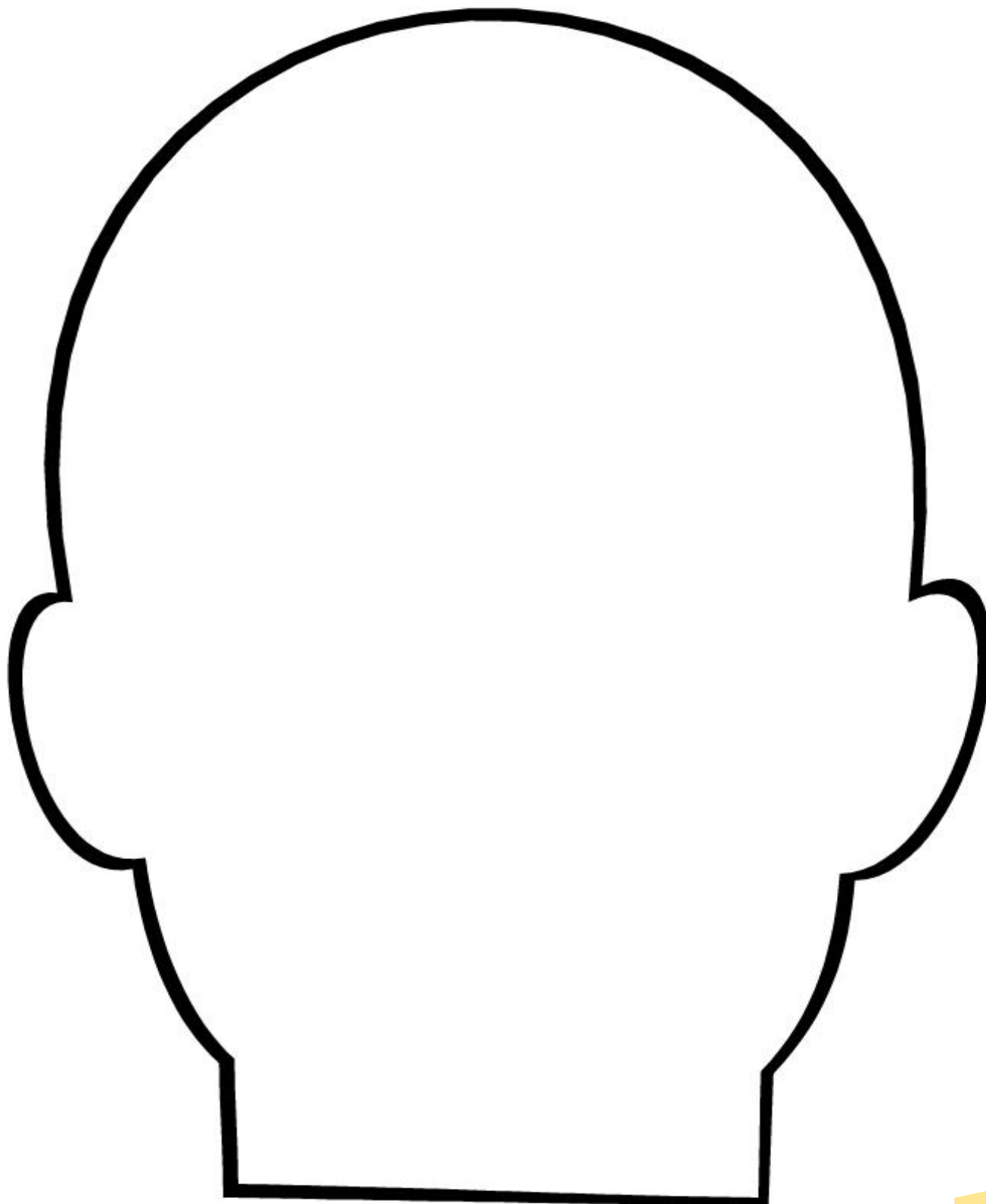
Provide accountability measures for students when using the strategy independently.

“Today when you are reading independently, I want you to be aware of the connections you’re making while reading. When you’re done reading, complete a quick-write in your Reading Reflection Journal, explaining the connections you made.”



# My Background Knowledge

I know a lot about ...



# Hatchet

Help.

He had to help.

He stretched one hand toward the pilot, saw that his fingers were trembling, and touched the pilot on the chest. He did not know what to do. He knew there were procedures, that you could do mouth-to-mouth on victims of heart attacks and push their chests—C.P.R.—but he did not know how to do it and in any case could not do it with the pilot, who was sitting up in the seat and still strapped in with his seatbelt. So he touched the pilot with the tips of his fingers, touched him on the chest and could feel nothing, no heartbeat, no rise and fall of breathing. Which meant that the pilot was almost certainly dead.

"Please," Brian said. But did not know what or who to ask. "Please...."

The plane lurched again, hit more turbulence, and Brian felt the nose drop. It did not dive, but the nose went down slightly and the down-angle increased the speed, and he knew that at this angle, this slight angle down, he would ultimately fly into the trees. He could see them ahead on the horizon where before he could see only sky.

He had to fly it somehow. Had to fly the plane. He had to help himself. The pilot was gone, beyond anything he could do. He had to try and fly the plane.

He turned back in the seat, facing the front, and put his hands—still trembling—on the control wheel, his feet gently on the rudder pedals. You pulled back on the stick to raise the plane, he knew that from reading. You always pulled back on the wheel. He gave it a tug and it slid back toward him easily. Too easily. The plane, with the increased speed from the tilt down, swooped eagerly up and drove Brian's stomach down. He pushed the wheel back in, went too far this time, and the plane's nose went below the horizon and the engine speed increased with the shallow dive.

Too much.

He pulled back again, more gently this time, and the nose floated up again, too far but not as violently as before, then down a bit too much, and up again, very easily, and the front of the engine cowlings settled. When he had it aimed at the horizon and it seemed to be steady, he held the wheel where it was, let out his breath—which he had been holding all this time—and tried to think what to do next.

It was a clear, blue-sky day with fluffy bits of clouds here and there and he looked out the win-

dow for a moment, hoping to see something, a town or village, but there was nothing. Just the green of the trees, endless green, and lakes scattered more and more thickly as the plane flew—where?

He was flying but did not know where, had no idea where he was going. He looked at the dashboard of the plane, studied the dials and hoped to get some help, hoped to find a compass, but it was all so confusing, a jumble of numbers and lights. One lighted display in the top center of the dashboard said the number 342, another next to it said 22. Down beneath that were dials with lines that seemed to indicate what the wings were doing, tipping or moving, and one dial with a needle pointing to the number 70, which he thought—only thought—might be the altimeter. The device that told him his height above the ground. Or above sea level. Somewhere he had read something about altimeters but he couldn't remember what, or where, or anything about them.

Slightly to the left and below the altimeter he saw a small rectangular panel with a lighted dial and two knobs. His eyes had passed over it two or three times before he saw what was written in tiny letters on top of the panel. TRANSMITTER 221, was stamped in the metal and it hit him, finally, that this was the radio.

# Making Connections

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

Title: \_\_\_\_\_

What I read Page #	Connections This reminds me ... I remember ...	My connection helps me understand the text because ...



TEXAS LITERACY INITIATIVE



# Making Inferences and Predictions

Grades 6 – 12





# Cognitive Strategy Routine

**Cognitive Strategy Lesson Planning**

Title of Text \_\_\_\_\_

<b>Step 1</b> Use a real-world example	Anchor lesson:
<b>Step 2</b> Give the strategy a name.	"Today, we are going to learn a strategy called _____"
<b>Step 3</b> Define the strategy, how and when it is used, and how it helps with reading.	Strategy definition:  How it helps us comprehend:
<b>Step 4</b> Give students touchstones.	Model hand gesture, explain strategy poster, and refer to anchor lesson.

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**Strategy Instruction**

**DIRECT • EXPLICIT • SYSTEMATIC**

*Increase of Responsibility*

1. Use a real-world example to create a context (anchor lesson).
2. Give the strategy a name.
3. Define the strategy, how and when it is used, and how it helps with reading.
4. Give students touchstones, such as a hand gesture or icon, to help them remember the strategy.
5. Think aloud, using the strategy in a variety of contexts.
6. Engage students by providing opportunities for them to share their thinking during the reading. Practice shared application with planned discussion prompts.
7. Scaffold practice, providing opportunities for students to use the strategy while reading, with teacher support and monitoring.
8. Provide accountability measures for students while using the strategy independently.

*Ongoing Assessment and Feedback*

**Ongoing Assessment** may include informal assessments such as anecdotal records, observations of class discussion, portfolios, projects, student records of thinking (post-it notes, drawings, and writings), as well as formal assessments.

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# Strategy Instruction

## DIRECT • EXPLICIT • SYSTEMATIC

Responsibility

1. Use a real-world example to create a context (anchor lesson).
2. Give the strategy a name.
3. Define the strategy, how and when it is used, and how it helps with reading.
4. Give students touchstones, such as a hand gesture or icon, to help them remember the strategy.

Ongoing Asses







## Use a Real-World Example (Step 1)



- An anchor lesson is a real-world example used to create context for a cognitive strategy.
- We refer to the anchor lesson to remind students of the cognitive strategy.





# Anchor Lesson for Making Inferences & Predictions





## Use a Real-World Example (Step 1)

“Remember when we looked through the purse and used the clues in the purse and our background knowledge to figure out who owned the purse?”



Record what you will say for Step 1 on your orange Cognitive Strategy Routine Lesson Planning Card.

Cognitive Strategy Lesson Planning	
Title of Text _____	
<b>Step 1</b> Use a real world example.	Anchor lesson: _____
<b>Step 2</b> Give the strategy a name.	Today, we are going to learn a strategy called _____
<b>Step 3</b> Define the strategy, how and when it is used, and how it helps with reading.	Strategy definition: _____
	How it helps us comprehend: _____
<b>Step 4</b> Give students touchstones.	Model hand gestures, explain strategy poster, and refer to anchor lesson.

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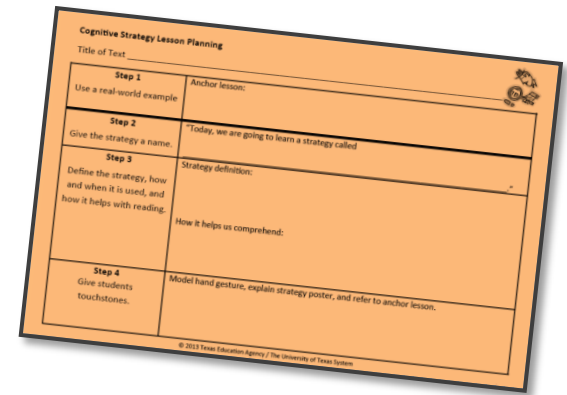




## Give the Strategy a Name (Step 2)

“Today, we’re going to talk about a strategy called Making Inferences and Predictions.”

Record what you will say for Step 2 on your orange Cognitive Strategy Routine Lesson Planning Card.



The image shows an orange 'Cognitive Strategy Lesson Planning Card' tilted at an angle. It has a title 'Cognitive Strategy Lesson Planning' and a field for 'Title of Text'. The card is divided into four steps:

Step 1	Anchor lesson:
Use a real-world example	
Step 2	"Today, we are going to learn a strategy called
Give the strategy a name.	
Step 3	Strategy definition:
Define the strategy, how and when it is used, and how it helps with reading.	How it helps us comprehend:
Step 4	Model hand gesture, explain strategy poster, and refer to anchor lesson.
Give students touchstones.	

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## Define the Strategy (Step 3)

“An inference is when we combine our background knowledge along with information in the text to understand what the author is not telling us directly. An inference about future information is a prediction. When we make inferences, it helps us understand text more fully.”





## Define the Strategy (Step 3)

Record what you will say for Step 3 on your orange Cognitive Strategy Routine Lesson Planning Card.

**Cognitive Strategy Lesson Planning**

Title of Text \_\_\_\_\_

<b>Step 1</b> Use a real-world example	Anchor lesson:  
<b>Step 2</b> Give the strategy a name.	"Today, we are going to learn a strategy called _____"
<b>Step 3</b> Define the strategy, how and when it is used, and how it helps with reading.	Strategy definition:  How it helps us comprehend:  
<b>Step 4</b> Give students touchstones.	Model hand gesture, explain strategy poster, and refer to anchor lesson.  

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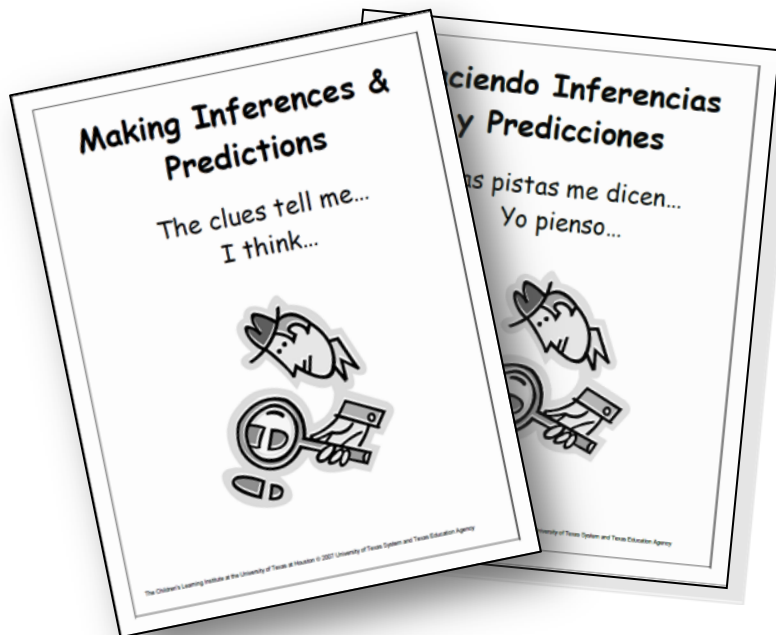
An inference is...





## Give Students Touchstones (Step 4)

You may choose to provide students with a hand motion that signals “Making Inferences and Predictions.”



Display strategy posters in the classroom.





## Give Students Touchstones (Step 4)

Touchstones: Explain the strategy poster and refer to the anchor lesson.

“When I make an inference, I will show you by pointing to the poster. Look at the detective on our poster. He is searching for clues in the text and using his background knowledge to make an inference. We made inferences when we tried to figure out to whom the purple purse belonged.”







# Give Students Touchstones (Step 4)

Record what you will say for Step 4 on your orange Cognitive Strategy Routine Lesson Planning Card.

**Cognitive Strategy Lesson Planning**

Title of Text \_\_\_\_\_

<b>Step 1</b> Use a real-world example	Anchor lesson: "Today, we are going to learn a strategy called _____"
<b>Step 2</b> Give the strategy a name.	Strategy definition: How it helps us comprehend:
<b>Step 3</b> Define the strategy, how and when it is used, and how it helps with reading.	Model hand gesture, explain strategy poster, and refer to anchor lesson.
<b>Step 4</b> Give students touchstones.	

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## Think-Aloud (Step 5)

“A think-aloud is a way to provide *instruction* rather than just give *instructions*” (Daniels & Zemelman, 2004, p. 238).

Students who struggle with reading “in general do not possess knowledge of strategies and often are not aware of when and how to apply the knowledge they do possess” (Duffy et al., 1987, p. 348).



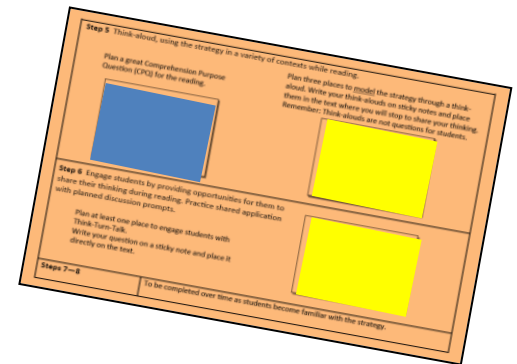


## Cognitive Strategy Lesson Planning Card (Side 2)

Step 5 is where we **SHOW** students how we use the strategy while reading.

We plan a Comprehension Purpose Question (CPQ), as well as places to model thinking-aloud for students.

Step 5 will differ with each lesson. We transfer the sticky notes from the planning card and place them on the text.





# Making Inferences Graphic Organizer

Graphic organizers can help struggling students to focus “attention on the text while they read or help them organize the incoming information contained in the text” (Almasi, 2003, p. 92).

This type of activity helps students to actively think about the text while they are reading. This particular organizer helps students to “explore a text by using text-explicit and text-implicit thinking processes... It is a child-centered strategy that allows the teacher to guide children both to the ideas in the text and to the processes involved in getting those ideas” (Searfoss & Readence, 1994, pp. 246-248).





# Think-Aloud (Step 5)



Use scaffolds to support student learning.

**Making Inferences Graphic Organizer**

Title: Their Eyes are Watching God – pp. 1-3  
 CPQ: What do we learn about the woman coming into town?

P. #	Statement About the Text that is Thought to be True	Direct (Explicit) or Inference (Implicit)?	Evidence (Text Clues)	Background Knowledge (Connections to What I Know)
1	She was coming back from burying the dead of someone who died suddenly.	direct	<ul style="list-style-type: none"> <li>She had come back from burying the dead ... the sudden dead.</li> </ul>	
2	The townspeople used to be envious of her but now they enjoyed seeing her fall on hard times and they were talking badly about her.	inference	<ul style="list-style-type: none"> <li>remember the envy they had stored</li> <li>swallowed with relish</li> <li>Burning statements ... laughs</li> <li>The mood come alive</li> <li>Words like harmony in a song</li> </ul>	They are remembering the envy was in the past. When you swallow something and the mood of that means you enjoy it. people's statements burn they laugh at you, they mean.
2	She's 40 years old.	direct	<ul style="list-style-type: none"> <li>What dat ole forty year ole 'oman doin' ...</li> </ul>	
2	Her hair is long and she's wearing it down which isn't appropriate for an older woman.	inference	<ul style="list-style-type: none"> <li>What dat ole forty year ole 'oman doin' wid her hair swingin' down her back like some young gal?</li> </ul>	Most women in their hair down like young girls are asking what she's doing wearing her hair like me they think it's not appropriate.

## In the Text

Its says it **right here**. I can see those words.

The **AUTHOR** says it **DIRECTLY**.

## In My Head

I have to use **clues** from the text and my **background knowledge**...

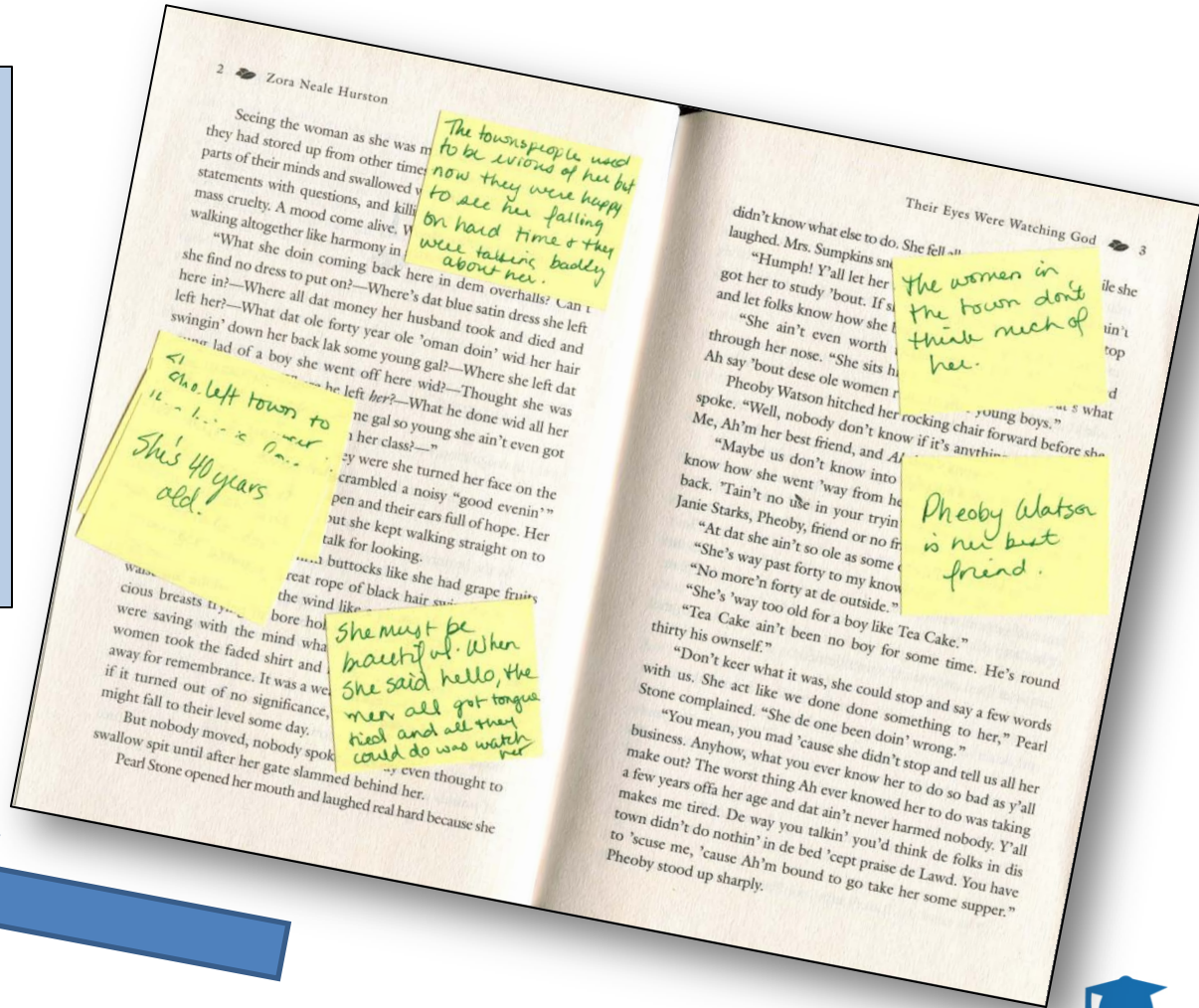
I have to make an **INFERENCE**.







CPQ: What do we learn about the woman coming into town?



**Step 5** Think-aloud, using the strategy in a variety of contexts while reading.

Plan a great Comprehension Purpose Question (CPQ) for the reading.

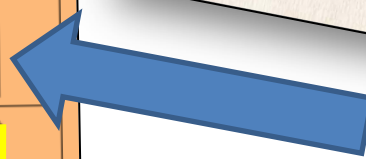
Plan three places to model the strategy through a think-aloud. Write your think-alouds on sticky notes and place them in the text where you will stop to share your thinking. Remember: Think-alouds are not questions for students.

Model the Strategy 3 Times

**Step 6** Engage students by providing opportunities for them to share their thinking during reading. Practice shared application with planned discussion prompts.

Plan at least one place to engage students with Think-Turn-Talk. Write your question on a sticky note and place it directly on the text.

**Steps 7-8** To be completed over time as students become familiar with the strategy.



## Making Inferences Graphic Organizer

Title: Their Eyes Were Watching God – pp. 1-3

CPQ: What do we learn about the woman coming into town?

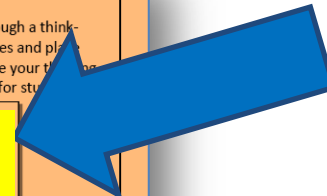
P. #	My Answers to the CPQ	Direct (Explicit) or Inference (Implicit)?	Evidence (Text Clues)	Background Knowledge (Connections to What I Know)
1	She was coming back from burying the dead - someone who died suddenly.	direct	<ul style="list-style-type: none"> <li>• She had come back from burying the dead... the sudden dead.</li> </ul>	
2	The townspeople used to be envious of her, but now they enjoyed seeing her fall on hard times.	inference	<ul style="list-style-type: none"> <li>• Remember the envy they had stored.</li> <li>• Swallowed with relish.</li> <li>• Burning statements... laughs.</li> <li>• The mood comes alive.</li> <li>• Coming back in dem overalls?</li> <li>• Where's that blue satin dress?</li> </ul>	They are remembering the envy, so it was in the past. When you relish something and the mood comes alive, it means you enjoy it. When people's statements burn and they laugh at you, they are being mean. She's dressed like she is poor.
2	She's 40 years old.	direct	<ul style="list-style-type: none"> <li>• What dat ole forty year ole 'oman doin'...</li> </ul>	
2	Her hair is long and she's wearing it down, which isn't appropriate for an older woman.	inference	<ul style="list-style-type: none"> <li>• What dat ole forty year ole 'oman doin' wid her hair swingin' down her back lak some young gal?</li> </ul>	Most women in their 40s don't wear their hair down (which means long) like young girls. The fact they are asking what she thinks she's doing wearing her hair like that, tells me they think it's not appropriate.



# Your Turn! (Step 5)

- Use the Think-Aloud sticky notes to record the first three statements you will stop to think-aloud for students.

<b>Step 5</b> Think-aloud, using the strategy in a variety of contexts while reading.	
Plan a great Comprehension Purpose Question (CPQ) for the reading.	Plan three places to <u>model</u> the strategy through a think-aloud. Write your think-alouds on sticky notes and place them in the text where you will stop to share your thoughts. Remember: Think-alouds are not questions for students.
<div style="border: 1px solid black; padding: 10px; text-align: center;">CPQ</div>	<div style="background-color: yellow; width: 100px; height: 100px;"></div>
<b>Step 6</b> Engage students by providing opportunities for them to share their thinking during reading. Practice shared application with planned discussion prompts.	
Plan at least one place to engage students with Think-Turn-Talk. Write your question on a sticky note and place it directly on the text.	<div style="background-color: yellow; width: 100px; height: 100px;"></div>
<b>Steps 7–8</b>	To be completed over time as students become familiar with the strategy.







## Engage Students (Step 6)

Ask students to share their thinking. Add statements to the graphic organizer and ask them to identify whether or not the statement is directly stated in the text or if they have to make an inference.

Is this true? Did the author tell us this directly or are we making an inference?





## Engage Students (Step 6)

“Discussion plays a key role in supporting the development of students’ understanding of text. It is through the interaction – or the transaction – of ideas, language, and perspective that comprehension is developed” (Israel & Duffy, 2009, p. 523).

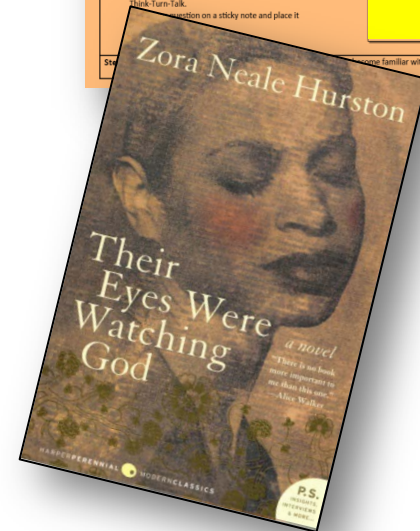
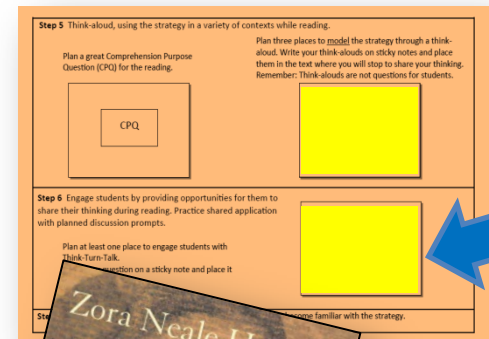




## Engage Students (Step 6)

Ask Think-Turn-Talk questions that require students to make inferences or predictions.

- “How did Janie feel about her discovery and why did she feel that way?”
- “Why is Nanny pushing so hard for Janie to get married?”
- “What are you inferring now?”
- “What do you think might happen?”





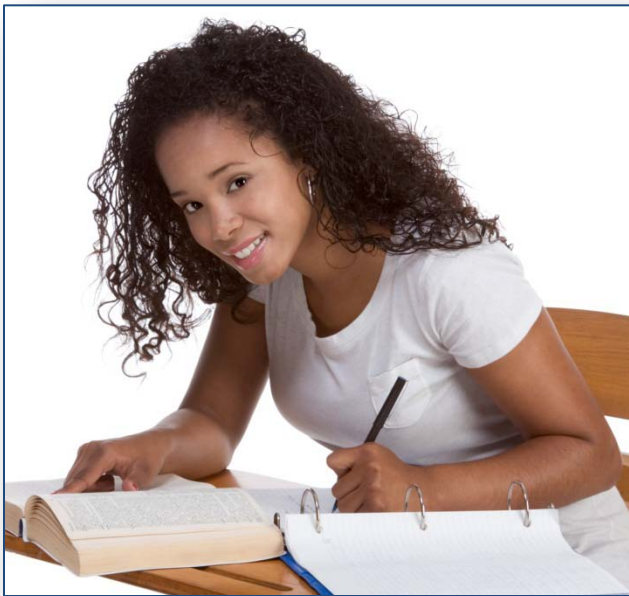
## Scaffold Practice (Step 7)

“Today, we are going to read a well-known poem called, *Invictus*. As you work to understand the poem, record the inferences you are making on sticky notes. You will share your inferences with your group. Be prepared to explain why you think what you do.”





## Provide Accountability Measures (Step 8)



“After reading the excerpt today, I would like you to write your response to the CPQ. In your writing, explain what you learned about the character and her motivations. Be sure to provide text evidence and background knowledge to support your thinking.”



*Ships at a distance have every man's wish on board. For some they come in with the tide. For others they sail forever on the horizon, never out of sight, never landing until the Watcher turns his eyes away in resignation, his dreams mocked to death by Time. That is the life of men.*

Now, women forget all those things they don't want to remember, and remember everything they don't want to forget. The dream is the truth. Then they act and do things accordingly.

So the beginning of this was a woman and she had come back from burying the dead. Not the dead of sick and ailing with friends at the pillow and the feet. She had come back from the sodden and the bloated; the sudden dead, their eyes flung wide open in judgment.

The people all saw her come because it was sundown. The sun was gone, but he had left his footprints in the sky. It was the time for sitting on porches beside the road. It was the time to hear things and talk. These sitters had been tongueless, earless, eyeless conveniences all day long. Mules and other brutes had occupied their skins. But now, the sun and the bossman were gone, so the skins felt powerful and human. They became lords of sounds and lesser things. They passed nations through their mouths. They sat in judgment.



Seeing the woman as she was made them remember the envy they had stored up from other times. So they chewed up the back parts of their minds and swallowed with relish. They made burning statements with questions, and killing tools out of laughs. It was mass cruelty. A mood come alive. Words walking without masters; walking altogether like harmony in a song.

“What she doin coming back here in dem overhalls? Can’t she find no dress to put on?—Where’s dat blue satin dress she left here in?—Where all dat money her husband took and died and left her?—What dat ole forty year ole ’oman doin’ wid her hair swingin’ down her back lak some young gal?—Where she left dat young lad of a boy she went off here wid?—Thought she was going to marry?—Where he left *her*?—What he done wid all her money?—Betcha he off wid some gal so young she ain’t even got —why she don’t stay in her class?—”

When she got to where they were she turned her face on the bander log and spoke. They scrambled a noisy “good evenin’” and left their mouths setting open and their ears full of hope. Her speech was pleasant enough, but she kept walking straight on to her gate. The porch couldn’t talk for looking.

But nobody moved, nobody spoke, nobody even thought to swallow spit until after her gate slammed behind her.

Pearl Stone opened her mouth and laughed real hard because she

didn't know what else to do. She fell all over Mrs. Sumpkins while she laughed. Mrs. Sumpkins snorted violently and sucked her teeth.

"Humph! Y'all let her worry yuh. You ain't like me. Ah ain't got her to study 'bout. If she ain't got manners enough to stop and let folks know how she been makin' out, let her g'wan!"

"She ain't even worth talkin' after," Lulu Moss drawled through her nose. "She sits high, but she looks low. Dat's what Ah say 'bout dese ole women runnin' after young boys."

Pheoby Watson hitched her rocking chair forward before she spoke. "Well, nobody don't know if it's anything to tell or not. Me, Ah'm her best friend, and Ah don't know."

"Maybe us don't know into things lak you do, but we all know how she went 'way from here and us sho seen her come back. 'Tain't no use in your tryin' to cloak no ole woman lak Janie Starks, Pheoby, friend or no friend."

"At dat she ain't so ole as some of y'all dat's talking."

"She's way past forty to my knowledge, Pheoby."

"No more'n forty at de outside."

"She's 'way too old for a boy like Tea Cake."

"Tea Cake ain't been no boy for some time. He's round thirty his ownself."

"Don't keer what it was, she could stop and say a few words with us. She act like we done done something to her," Pearl Stone complained. "She de one been doin' wrong."



**Making Inferences Graphic Organizer**

Title: \_\_\_\_\_

CPQ: \_\_\_\_\_

P. #	My Answers to the CPQ	Direct (Explicit) or Inference (Implicit)?	Evidence (Text Clues)	Background Knowledge (Connections to What I Know)

## Making Inferences Graphic Organizer

Title: Their Eyes Were Watching God – pp. 1-3

CPQ: What do we learn about the woman coming into town?

P. #	My Answers to the CPQ	Direct (Explicit) or Inference (Implicit)?	Evidence (Text Clues)	Background Knowledge (Connections to What I Know)
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2	The townspeople used to be envious of her but now they enjoyed seeing her fall on hard times.	inference	<ul style="list-style-type: none"> <li>• Remember the envy</li> <li>• Swallowed with relish</li> <li>• Burning statements ... laughs</li> <li>• Coming back in dem overalls?</li> <li>• Where's that blue satin dress?</li> <li>• All dat money</li> </ul>	They are remembering the envy so it was in the past. When you relish something and the mood comes alive that means you enjoy it. When people's statements burn and when they laugh at you, they are being mean. She's dressed like she is poor.
2	She's 40 years old.	direct	<ul style="list-style-type: none"> <li>• What dat ole forty year ole 'oman doin' ...</li> </ul>	
2	Her hair is long and she's wearing it down which isn't appropriate for an older woman.	inference	<ul style="list-style-type: none"> <li>• What dat ole forty year ole 'oman doin' wid her hair swingin' down her back like some young gal?</li> </ul>	Most women in their 40s don't wear their hair down (which means long) like young girls. The fact that they are asking what she thinks she's doing wearing her hair like, that tells me they think it's not appropriate.

2	She left the town to marry a poor, younger man, but that didn't work out.	inference	<ul style="list-style-type: none"> <li>• Where she left dat young lad of a boy she went off here wid?</li> <li>• Thought she was going to marry?</li> <li>• What he done wid all her money?</li> <li>• Why she don't stay in her class?</li> </ul>	It says that she left with a younger man and she thought she was going to marry him. Now she is alone and it seems like her money is gone. Class is like lower class and middle class. She didn't stay in her class, which tells me he was poor compared to her.
2	She was higher class compared to the rest of the townspeople.	inference	<ul style="list-style-type: none"> <li>• Remember the envy they had stored</li> <li>• Where's that blue satin dress</li> <li>• Where all dat money ...</li> <li>• Why she don't stay in her class?</li> </ul>	People are jealous of others when they have less than them. It sounds like she had money and used to dress nice. Since they talk about her staying in her class, it makes me think she's in a different class than all of them as well.
2	She must be beautiful. When she said hello, the men all got tongue-tied and all they could do was watch her.			
3	The women in the town don't think much of her.			
3	Pheoby Watson is her best friend.			

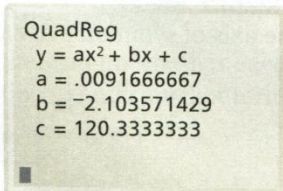
step 6

**4 EXAMPLE** **Real-World Connection**

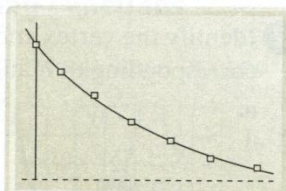


**Hydraulics** The table at the left shows the height of a column of water as it drains from its container. Model the data with a quadratic function. Graph the data and the function. Use the model to estimate the water level at 35 seconds.

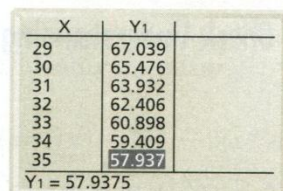
**Step 1** Enter the data. Use **QuadReg**.



**Step 2** Graph the data and the function.



**Step 3** Use the table feature to find  $f(35)$ .



An approximate model of the quadratic function is  $y = 0.009167x^2 - 2.10x + 120$ .  
 At 35 seconds the water level is approximately 58 mm.

**Check Understanding**

- 4** a. Use the quadratic model to estimate the water level at 25 seconds.  
 b. Use the quadratic model to predict the water level at 3 minutes.  
 c. **Critical Thinking** Is your prediction in part (b) reasonable? Explain.

## Making Inferences Graphic Organizer

Title: Using Quadratic Models, Chapter 5, p. 236

CPQ: What information from the table helps you to know your prediction for b. is reasonable?

P. #	My Answers to the CPQ	Direct (Explicit) or Inference (Implicit)?	Evidence (Text Clues)	Background Knowledge (Connections to What I Know)
	As time elapses, the water level decreases.	inference	<ul style="list-style-type: none"> <li>• <math>0\text{ s} = 120\text{ mm}</math>.</li> <li>• <math>60\text{ s} = 28\text{ mm}</math>.</li> <li>• Water drains from its container (says in the problem).</li> </ul>	When water drains from something, the level decreases like when you drain a bathtub. It takes time for something to drain. It doesn't happen instantly.
	b. The water level at 1 minute is 28 mm, my prediction of 39 mm at 3 minutes is unreasonable.	inference	<ul style="list-style-type: none"> <li>• <math>60\text{ s} = 28\text{ mm}</math>.</li> </ul>	At the start of the second minute, there are only 28 mm left. My prediction of 39 mm is higher than the level at the 1 minute mark. It's not possible for the container to refill itself because it is draining. My answer is unreasonable.



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▼ **Figure 14-3** This drawing shows what the symbols in a pedigree represent. **Interpreting Graphics** What are the genotypes of both parents on the left in the second row? How do you know?

**Pedigree Charts** A **pedigree** chart, which shows the relationships within a family, can be used to help with this task. The pedigree in **Figure 14-3** shows how an interesting human trait, a white lock of hair just above the forehead, is transmitted through three generations of a family. The allele for the white forelock trait is dominant. At the top of the chart is a grandfather who had the white forelock trait. Two of his three children inherited the trait, although one child did not. Three grandchildren have the trait, and two do not.

Genetic counselors analyze pedigree charts to infer the genotypes of family members. For example, since the white forelock trait is dominant, all the family members that lack the trait must have homozygous recessive alleles. Since one of the grandfather's children lacks the white forelock trait, the grandfather must be heterozygous for the trait.

