

# Chapter 3

## Exploring Reading Comprehension Skills using PIRLS



### Schematic Description of Two PIRLS Texts and Items

**Abstract** Using one narrative and one informative PIRLS text and their corresponding items, this chapter helps teachers gain insight into the four reading processes. The specific reading skills, vocabulary, and background knowledge required to answer each question are explained. The chapter illustrates which difficulties students may encounter in a text and how teachers can help their students by using the didactic principles described in Chapter 2. The schematic description of each item includes the international PIRLS average. Schools can compare this with their own national average using the PIRLS almanacs and see if they recognize these national results in the reading level of their own students.

**Keywords** Progress in International Reading Literacy Study (PIRLS) · Reading skills · Reading processes · Practical guidelines · PIRLS texts

### 3.1 Introduction

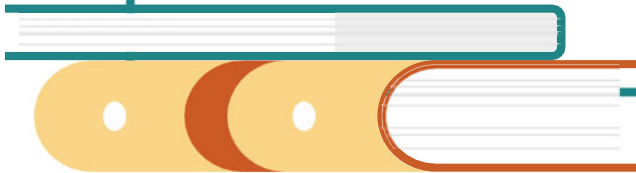
In this chapter we discuss two PIRLS texts to illustrate the four reading processes: (1) focusing on and retrieving information explicitly stated in the text, (2) making straightforward inferences, (3) interpreting and integrating ideas and information, and (4) evaluating and critiquing content and textual elements, and the vocabulary and background knowledge that is required to understand these types of texts. This chapter is not intended to provide a method for testing comprehension, or to use test material as a teaching tool. Rather, its purpose is to give teachers a better insight into the reading processes described in Chapter 1, and to give teachers more concrete suggestions for implementing the didactic principles described in Chapter 2. Through these insights and ideas, teachers can better determine which aspect of reading comprehension students need extra support on and how they can provide this support.

## 3.2 How to Read this Chapter

In the schematic description of the PIRLS items below (see Section 3.3), we discuss each item from two publicly released PIRLS texts. Descriptions are provided for what students need to know or do in terms of reading skills, vocabulary, and background knowledge, to answer the question correctly. The international PIRLS average per item is also given (percentage of students who received full or partial credit). Comparing the international average percent of correct item scores with the corresponding national average scores by using the PIRLS almanacs can give teachers an idea of the reading processes the students in their country do well on, and which ones they struggle with. Teachers can discuss these findings in their school team: Does the school team recognize these national results in their own students, based on their own tests and observations during reading instruction? Are there types of items/questions that their students have difficulty with? Are there a lot of students in the school who struggle with understanding texts due to low vocabulary levels or a lack of background knowledge? Teachers can look up the items associated with these reading processes or factors (vocabulary/ background knowledge) and see which didactic suggestions might work best. These suggestions can give teachers inspiration on how to help their students improve their reading comprehension skills. More detailed information about the didactic principles, which the suggestions are based on, can be found in Chapter 2. Textbox 3.1 illustrates how teachers can use the information in this chapter to make decisions about teaching reading comprehension.

Textbox 3.1: An example of a school process for improving teaching reading comprehension

Ms. Gonzales teaches grade 4. After studying the items from the text "Flowers on the Roof" and comparing her country's national averages in the almanacs with the international averages, she noticed that students in her country score below the international average for most of the items associated with the reading process "Examine and Evaluate Content, Language, and Textual Elements." She talks about this with her colleagues, and they recognize their own students in these results. Students in their school often have difficulty evaluating the content of texts. Questions like "Why would the writer write it like this?" or "What can you learn from this text?" are more challenging for them, and they do not seem to be used to thinking about texts in this way. Ms. Gonzales reads the didactic suggestions that are given for the items about "evaluating" and collects some ideas to share with her colleagues. In the next teacher meeting, after reading about and discussing evidence-based didactic principles, the team decides to take more time for discussions to evaluate the text in their reading lessons [in-depth interaction]. They also intend to demonstrate, by modeling, how students can ask questions about the text to enhance text comprehension [explicit strategy instruction: asking questions]. By observing each other's reading lessons, teachers give each other feedback on how to model this reading strategy. For the students who struggle with texts due to their vocabulary, the teachers decide to select the unknown words in advance and explain them in various ways to small groups of students [monitoring and differentiating]. When they read the text with the whole class, these students have already been introduced to the unknown words in the text.



### 3.3 Schematic Description of Two PIRLS Texts and Items

#### 3.3.1 “Flowers on the Roof”—By Ingibjörg Sigurdardóttir

“Flowers on the Roof” is a narrative text, and the reading purpose is to read for literary experience. The story is about an elderly woman (Granny Gunn) who is more or less forced to move from her farm to the city. She gets homesick in the city and decides to get as much of her old farm into her flat as possible, including the hens and the grass with flowers on the roof. The story is told by a boy who lives opposite her, and he describes how Granny tries to feel more at home (Tables 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12 and 3.13).

## Flowers on the Roof

by Ingibjörg Sigurdardóttir



Shall I tell you about a granny I know? She’s a really strange old lady, and so full of life! Her real name is Gunnjona, but I call her Granny Gunn. Before she moved into our block of flats she lived in the country. Her farmhouse was just like a doll’s house. It had tiny little windows and the roof was covered with grass. And there were flowers growing on the roof too!

Granny Gunn had lived all on her own in the farmhouse but she was never lonely because she had many animals to play with: a cow, seven hens, two sheep and a cat.

One day Granny Gunn became ill.

“You aren’t seriously ill, but you should move into town,” the doctor had said. “It’s not very wise to live here all alone. Your cow can’t call me if you break your leg out in the yard!”

“I can look after myself!” Granny Gunn answered. But then she thought that maybe it would be fun to live in town.

“All right!” she said suddenly. “I’ll move to town.”

Soon she had sold her farm and bought an apartment in our block of flats.

But what was she going to do about the animals? She couldn’t take them to town with her, could she?



Luckily, the people on the next farm kindly said that they would look after them. It was still very difficult for Granny Gunn to say goodbye to her animal friends. She was so sad that in the end she decided to take her cat, Robert, with her.



Granny Gunn packed all her things into a van and was soon on her way to her new home. She was very excited and really looking forward to seeing the town.

I was very excited, too! I couldn't wait to see who was going to move into the apartment opposite ours. Perhaps it would be another little boy for me to play with. But it was Granny Gunn. Still, at least she had a cat.

Granny Gunn wasn't too happy when she looked around her new flat.

"This is just dreadful!" she said. "The walls are all smooth and white. And just look at those windows! They're far too big!" She became very quiet.

"I'm off back home!" she said, and turned to leave.

Then she suddenly gave a little scream. Robert the cat had jumped out of the window!



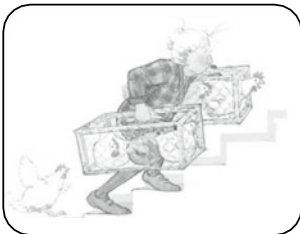
"Don't worry," I said quickly. "He's only jumped out onto the balcony. Look."

Granny Gunn rushed past me onto the balcony. But when she got there, she forgot all about Robert. The balcony was huge, and she could see the mountains far away and even a bit of the sea. Granny Gunn crouched down so that she couldn't see any of the rooftops—only the mountains and the sky. Granny Gunn decided to stay after all.

But the next day when I went around to help her unpack, she still looked very unhappy.

"Are you upset because all your animals are so far away?" I asked her.

"I do rather miss them," she sighed.



"Then why don't you go and fetch them?" I asked.

Granny Gunn winked at me and gave me a funny grin.



There was no one at home when I came to visit her the next day. Granny Gunn had taken the bus out into the country.

That night I woke up to hear a strange cackling

sound coming up the stairs. What could it be? Of course! The hens! They must have been too frightened to go in the lift!

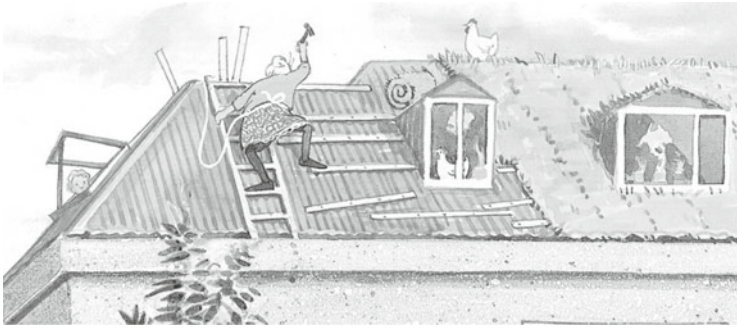
The next morning, I helped Granny Gunn feed the hens.

"I feel as if I'm back home," she said. "The hens are cackling all around me, and if I squint, I can easily imagine that the mountains I see are those near my farm. All that's missing is the smell of earth and grass." Suddenly she opened her eyes wide and sat up. Granny Gunn had clearly thought of something new.

"Well now," she said. "Don't you think it would be rather nice to have some grass on the roof? I think we'll have to go to town tomorrow!"

And that's exactly what we did.

When we got home, Granny Gunn carried the pieces of turf up onto the roof. She laid them out carefully, and fixed them so that they wouldn't fall off.







Granny Gunn is much happier now. She's made a bit of countryside here in the town. She's now as fond of her rooftop garden as she had been of her old farm. And there are flowers growing on the roof once more.

Granny Gunn is not like anyone else I know. She can do anything! There's only one thing that bothers her now. How is she going to get the cow into the lift?!

**Table 3.1** Flowers on the Roof—Question 1: Identity of the narrator

Question	Who is telling the story? a. a granny b. a child c. a doctor d. a farmer
Correct answer	b
Percentage of students who received full credit (international average)	78%
Process of comprehension	Interpret and integrate ideas and information
Skills	To answer this question correctly, students need to be able to infer the narrator’s identity from the sentence “Her real name is Gunnjona, but I call her Granny Gunn.” It is likely a child will call an old lady “granny.” Or students can infer the narrator’s identity from the sentence “Perhaps it would be another little boy for me to play with.”
Vocabulary	Students need to know that a granny is the same as a grandmother or grandma.
Didactic suggestion	When students have difficulty identifying the narrator, it could help to put themselves in the role of narrator. The student reads the sentences the narrator says out loud. “So you call this lady Granny Gunn. What kind of person do you think you are? Why do you think that? Let’s read further, to see if you’re right” [explicit strategy instruction: visualizing]. Also, by modeling asking questions, students gain more insight into the different characters of the story. “Who is this ‘I’ person in this story? Why does the ‘I’ person hope that it is another boy to play with?” [explicit strategy instruction: asking questions]. If students don’t know the meaning of a granny, talk about what other words the word is similar to [monitoring and differentiating].

**Table 3.2** Flowers on the Roof—Question 2: Granny’s farmhouse

<p>Question</p>	<p>Which of these is most like Granny Gunn’s farmhouse?                  a. </p> <p>b. </p> <p>c. </p> <p>d. </p>
<p>Correct answer</p>	<p>c</p>
<p>Percentage of students who received full credit (international average)</p>	<p>78%</p>
<p>Process of comprehension</p>	<p>Make straightforward inferences</p>
<p>Skills</p>	<p>To answer this question correctly, students need to read this part of the text very carefully: “It had tiny little windows and the roof was covered with grass. And there were flowers growing on the roof too!” Students are asked to translate this information into a drawing.</p>
<p>Didactic suggestion</p>	<p>Visualize the content of the text together, while talking about the text. “It says, the house had tiny little windows. Let’s try to draw a house with tiny little windows. Does the writer mention anything about the color of the house? No. So we don’t know the color. But we do know something about the roof! What does the roof look like?” It is also possible to visualize the text mentally [explicit strategy instruction: visualizing].</p>



**Table 3.3** Flowers on the Roof—Question 3: The reason Granny should move

Question	Why did the doctor think that Granny Gunn should move to town? a. because she was lonely without her friends b. so she could live with her relatives c. because she could not take care of her animals d. in case she needed someone to look after her
Correct answer	d
Percentage of students who received full credit (international average)	76%
Process of comprehension	Make straightforward inferences
Skills	To answer this question correctly, students need to interpret this part of the text: “It’s not very wise to live here all alone. Your cow can’t call me if you break your leg out in the yard.” Students have to infer that the doctor thinks she should move to town because there are people there who can look after her, in case she needs help.
Background knowledge	Students need to know about the difference in the number of people living in a town and in the countryside.
Didactic suggestion	To help students understand this part of the text, it can be helpful to discuss the difference between a town (where Granny moved to) and the countryside (where she came from). By creating a Venn diagram, together with the teacher or in pairs, the differences and similarities between a town and the countryside can be displayed. Filling in a table with characteristics of the city and the countryside can be useful as well. Students’ prior knowledge on this subject is activated when working on a graphic organizer together, and can be linked to Granny’s reason for moving [in-depth interaction].

**Table 3.4** Flowers on the Roof—Question 4: Who offered to look after the animals

Question	Who offered to look after Granny Gunn’s animals when she moved to town? a. he people on the next farm b. the doctor c. Granny Gunn’s family d. Robert
Correct answer	a
Percentage of students who received full credit (international average)	83%
Process of comprehension	Focus on and retrieve explicitly stated information and ideas
Skills	To answer this question correctly, students should find the following sentence: “Luckily, the people on the next farm kindly said that they would look after them.” This states explicitly who offered to take care of the animals.

(continued)

**Table 3.4** (continued)

Didactic suggestion	When students have trouble finding this sentence, try to remind students what to do if they cannot find certain information in the text. Perhaps they can read a part of the text again, or read ahead in the text [explicit strategy instruction: monitoring and clarifying comprehension].
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**Table 3.5** Flowers on the Roof—Question 5: Why was Granny unhappy

Question	Granny Gunn did not like the walls and windows in her new flat. Why else was she unhappy? a. she was ill b. she missed her cat c. she did not like the balcony d. she felt homesick
Correct answer	d
Percentage of students who received full credit (international average)	67%
Process of comprehension	Make straightforward inferences
Skills	To answer this question correctly, students need to be able to interpret the sentences: “‘Are you upset because all your animals are so far away?’ I asked her. ‘I do rather miss them,’ she sighed.” This scene outlines that she was homesick.
Background knowledge	Students need to know what it feels like to be homesick.
Didactic suggestion	Let students share their own experiences of missing someone, for example when they were staying with someone or were on vacation somewhere. Talk about their feelings when they were away. Relate students’ own experiences of being homesick to Granny’s feelings in the text [in-depth interaction; explicit strategy instruction: making connections].

**Table 3.6** Flowers on the Roof—Question 6: Why Granny screamed

Question	Why did Granny Gunn scream when the cat jumped out of the window?
Correct answer	The response provides an appropriate inference for why Granny screamed. It demonstrates understanding that Granny did not know there was a balcony outside of her window. It may simply state that she did not know this, or the response may focus on the fact that she was afraid her cat would be hurt or could die.
Percentage of students who received full credit (international average)	57%
Process of comprehension	Make straightforward inferences

(continued)

**Table 3.6** (continued)

Skills	To answer this question correctly, students need to read the part from “Then she suddenly gave a little scream” to “He’s only jumped out onto the balcony. Look” and conclude from this and the fact that Granny lived in a flat, that Granny thought her cat would fall down, and that she didn’t know there was a balcony.
Vocabulary	Students need to know what a balcony is.
Didactic suggestion	It can be helpful to visualize this part of the text by drawing pictures of the scene, like a comic book [explicit strategy instruction: visualizing]. Talk about this scene and Granny’s reaction while visualizing the story [in-depth interaction]. When students are unfamiliar with the word “balcony,” show them pictures of all kinds of balconies and talk about what kind of buildings have balconies and what you can do on a balcony [monitoring and differentiating].

**Table 3.7** Flowers on the Roof—Question 7: Why Granny crouched down


Question	When Granny Gunn was on the balcony, she crouched down so that she could not see any of the rooftops— only the mountains and the sky. Why did she do this?		
Correct answer	<p>The response demonstrates complete comprehension by integrating ideas from across the text to interpret Granny’s feelings about the mountains and sky. The response provides a connection between Granny’s view from the balcony and her home in the country. It may state that Granny was reminded of her home in the country when she saw the mountains and the sky. Or, the response may suggest that Granny could actually see the countryside where she had lived.</p> <p>For partial credit, the response demonstrates partial comprehension of Granny’s feelings about the mountains and the sky. The response accurately describes Granny’s feelings about the view from her balcony, or provides an appropriate explanation for why she did this. However, the response does not make a connection to her feelings about her home in the country.</p>		
Percentage of students who received full credit (international average)	36%	Percentage of students who received partial credit (international average)	51%
Process of comprehension	Interpret and integrate ideas and information		
Skills	To get full credit for this answer, students should sense Granny’s feelings in this scene. They can infer that from phrases like “wasn’t too happy,” “just dreadful,” and “she became very quiet.” Also, they need to infer the changes in her feelings from the last sentence in the scene on the balcony (“Granny Gunn decided to stay after all”). Students can conclude from this that Granny was less homesick after seeing the mountains and sky, as this view reminded her of home.		

(continued)

**Table 3.7** (continued)

Didactic suggestion	<p>When students have difficulty interpreting and integrating a scene, try to act out this part of the story with a couple of students and ask questions about the feelings Granny has and how they changed. “She became very quiet. How did she feel at the time, do you think?” [explicit strategy instruction: visualizing]. Stimulating students to ask themselves questions about the text can help them to understand this part better. Demonstrate aloud what kind of questions they can ask and how to answer them: “Why did she decide to stay after all? I thought she was homesick. The view of the mountains made her feel better. I wonder why?” [explicit strategy instruction: asking questions]. Work together with a group of students who have more difficulty with this, and let students take over asking questions more and more. Keep modeling asking questions for the students who continue to find this difficult [monitoring and differentiating].</p>
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**Table 3.8** Flowers on the Roof—Question 8: Granny winked and grinned

Question	<p>Find the part of the story by this picture of Granny Gunn:</p>  <p>Why did Granny Gunn wink and grin at the little boy?</p>
Correct answer	<p>The response provides an appropriate inference for why Granny winked. It demonstrates understanding that Granny realized at that point that she could bring more of her animals to the city. It may simply state that she had an idea or a plan, or that she realizes the little boy had a good idea. The response may also simply indicate that Granny agrees with the little boy’s idea, or it may describe that the idea was to bring more of her animals to the city. The response may accurately describe the little boy’s idea that prompted her wink and grin.</p>
Percentage of students who received full credit (international average)	64%
Process of comprehension	Make straightforward inferences
Skills	<p>To answer this question correctly, students need to link the question of the narrator (“Then why don’t you go and fetch them?”) to Granny’s nonverbal response. This question gave Granny an idea. When students read further, they find out what her idea is.</p>
Background knowledge	<p>Students need to know about the meaning of these nonverbal expressions such as winking and giving a grin, like having a mutual secret or a special (secret) idea.</p>

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**Table 3.8** (continued)

Didactic suggestion	Discuss the meaning of giving someone a wink and make a connection to the text. “Did somebody ever wink at you? Why do people do that? Why did Granny do that?” [in-depth interaction]. Read the part of the text out loud and model how to make connections with prior knowledge about the meaning of winking [explicit strategy instruction: making connections]. Use winking throughout the day for children who have difficulty with the meaning of a wink. Briefly discuss the meaning with these students [monitoring and differentiating].
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**Table 3.9** Flowers on the Roof—Question 9: How Granny made her new flat feel like home

Question	Write two ways in which Granny Gunn made her new flat feel like home.		
Correct answer	<p>The response demonstrates complete comprehension of Granny’s actions to make her flat feel like home. It provides any two of the following actions taken by Granny:</p> <ul style="list-style-type: none"> <li>• Actions related to her animals</li> <li>• Actions related to her cat</li> <li>• Actions related to her roof</li> </ul> <p>For partial credit, the response demonstrates partial comprehension of Granny’s actions to make her flat feel like home and provides only one of the actions taken by Granny listed.</p>		
Percentage of students who received full credit (international average)	63%	Percentage of students who received partial credit (international average)	82%
Process of comprehension	Focus on and retrieve explicitly stated information and ideas		
Skills	<p>To get full credit for this answer, students need to read the last part of the text, relate this to the part they have read before, and select the two ways in which Granny Gunn made her new flat feel like home.</p> <p>Students need to understand that Granny picked up the hens and covered the roof with grass, so her new home looks more like her old one. What her old farm looked like and the fact that she doesn’t feel at home is described earlier in the text.</p>		
Didactic suggestion	<p>Demonstrate out loud how to summarize or retell the story. To stimulate students to retell the story themselves, ask questions like “What happened first? And after that?” and write down the events in the correct order. Emphasize the relationship between the problem in the text (homesick) and the different solutions, for example, by creating a scheme. The next step is to teach students to ask these sorts of questions themselves and that by answering their own questions, they summarize the story [explicit strategy instruction: summarizing]. Students can also work in pairs or small groups and take turns summarizing a paragraph. After one student has summarized a paragraph, the other group members complete the summary and discuss how to improve the summary [in-depth interaction].</p>		

**Table 3.10** Flowers on the Roof—Question 10: How Granny feels at the end of the story

Question	At the end of the story, how did Granny Gunn feel about her new home?
Correct answer	The response provides an appropriate inference of Granny’s feelings at the end of the story. It demonstrates understanding that Granny had a positive feeling about her new home at the end of the story.
Percentage of students who received full credit (international average)	83%
Process of comprehension	Make straightforward inferences
Skills	To answer this question correctly, students need to find the sentence “Granny Gun is much happier now” in the last part of the text. This sentence literally reflects how granny feels at the end of the story. Students can also conclude from the end of the text that Granny felt at home now.
Didactic suggestion	It can be helpful to reread the last part of the text together. By modeling, the teacher can show which part of the text holds the answer [explicit strategy instruction: monitoring and clarifying comprehension]. Or students can briefly discuss Granny’s feelings in pairs and formulate an answer. Collect the answers and start a group discussion about Granny’s feelings. Talk about the difference in the meaning of feelings, such as “relieved,” “feeling at home,” and “happy” [in-depth interaction].

**Table 3.11** Flowers on the Roof—Question 11: The purpose of last line of the story

Question	The last line in the story is: “How is she going to get the cow into the lift?!” Why does the story finish with this question? a. to add a joke to the story b. to explain the moral of the story c. to make the story believable d. to help the reader understand what happened
Correct answer	a
Percentage of students who received full credit (international average)	59%
Process of comprehension	Examine and evaluate content, language, and textual elements
Skills	To answer this question correctly students should be able to interpret this sentence as a joke.
Didactic suggestion	When students have trouble interpreting these kinds of jokes, it is a good idea to start a discussion about the meaning and purpose of this sentence. Maybe the teacher can collect several texts with these kinds of jokes and talk about why the author added such jokes. Students can also think of their own jokes at the end of a text [in-depth interaction].

**Table 3.12** Flowers on the Roof—Question 12: What were the little boy’s feelings

Question	What were the little boy’s feelings about Granny Gunn when she first moved in, and at the end of the story? Use what you have read to describe each feeling and explain why his feelings changed.		
Correct answer	For full credit (3 points), the response may describe the little boy’s feelings about or impressions of Granny Gunn. The response demonstrates extensive comprehension by integrating ideas from across the text to interpret the little boy’s feelings about Granny Gunn when she first moved in and at the end of the story, as well as why his feelings about her changed.		
	<p>The response describes the little boy’s negative feelings when Granny Gunn first moved in and the positive feelings he had at the end of the story. In addition, the response explains why his feelings changed using appropriate and specific information from the story. Often, his feelings at the end will be implied through the explanation for why his earlier feelings changed. Or the response describes the child’s plausible feelings of empathy for Granny Gunn when she first moved in and at the end of the story, rather than feelings about her, explains why his feelings changed.</p> <p>For partial credit (2 points), the response demonstrates satisfactory comprehension of the little boy’s feelings about Granny Gunn and why they changed. The response describes the little boy’s negative feelings when Granny Gunn first moved in and the positive feelings he had at the end of the story. However, it does not explain why his feelings changed or may include only a vague or general reason for the change. Or the response describes one of his feelings (his negative feelings about Granny Gunn when she first moved in or his positive feelings about her at the end of the story) and explains why his feelings changed.</p> <p>The response does not demonstrate understanding of the progression of negative to positive feelings. Often, these responses will describe and explain his feelings at the end only.</p> <p>For partial credit (1 point), the response demonstrates limited comprehension of the little boy’s feelings. The response describes his negative feelings about Granny Gunn when she first moved in or his positive feelings about her at the end of the story. Or the response explains why his feelings changed but does not describe either feeling.</p>		
Percentage of students who received full credit (international average)	27%	Percentage of students who received partial credit (international average)	45%
Process of comprehension	Interpret and integrate ideas and information		
Skills	To get the full credit for this answer, students need to be able to interpret the (changed) feelings of the narrator during the whole story. For example, the disappointment when Granny moved in, instead of a boy to play with, or feelings of proudness and happiness at the end because Granny can do anything.		

(continued)

**Table 3.12** (continued)

Didactic suggestion	<p>Model how the boy is feeling, while reading the text out loud. For example, when reading the part, “Granny Gunn is not like anyone else I know. She can do anything!” model the feelings of the boy: “So the boy thinks Granny can do anything! He must feel happy she lives near him now. Or maybe he is proud of her, because she can do anything. I would be proud!” [explicit strategy instruction: making connections].</p> <p>Students can also do this in pairs. One reads a part of the text and the other shares how they think the boy is feeling. Students complement each other [in-depth interaction]. Help pairs who have trouble comprehending the boy’s feelings by searching for words and sentences in the text that are related to his feelings. Model how to infer the boy’s feelings from that part of the text [monitoring and differentiating].</p>
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**Table 3.13** Flowers on the Roof—Question 13: The lesson learned from the story

Question	<p>Which of the following might you learn from this story?</p> <p>a. old people will never be happy if they change where they live</p> <p>b. you can make a new place feel like home if you bring familiar things with you</p> <p>c. you can get used to living with animals, even though they are noisy</p> <p>d. children and old people do not make good friends</p>
Correct answer	b
Percentage of students who received full credit (international average)	70%
Process of comprehension	Examine and evaluate content, language, and textual elements
Skills	<p>To answer this question correctly, students need to evaluate the underlying message of the story.</p> <p>Therefore, they need to understand the complete story about Granny.</p>
Didactic suggestion	<p>Start a discussion about what students can learn from a text. First, students can discuss this in small groups, for example, based on cards with questions such as “What would the main character have learned from the story?” or “If you were the writer of this story, what would your message be to the reader?” and later share their conclusions with the whole group [in-depth interaction]. Relate other stories about moving away to the story of Granny Gunn. Does this character also make the new place feel like home? How does he or she do that? What is the same, and what is different from Granny’s story? What can you learn from this new story? [reading in a meaningful and functional context].</p>



### **3.3.2 “Giant Tooth Mystery”—By Kate McMullan**

“Giant Tooth Mystery” is an informative text, and the reading purpose is to acquire and use information. In short, it is about the discovery that years ago animals lived on earth that are now extinct. It starts with the fossils found by Bernard Palissy hundreds of years ago. He was thrown into prison for his new ideas about extinct creatures. Later, Gideon Mantell searched for evidence for his theory about a giant tooth that his wife found. Gideon believed this mystery tooth belonged to a giant reptile that no longer lives on earth. Years later, complete skeletons were found which turned out to be from creatures we now call dinosaurs (Tables [3.14](#), [3.15](#), [3.16](#), [3.17](#), [3.18](#), [3.19](#), [3.20](#), [3.21](#), [3.22](#), [3.23](#), [3.24](#), [3.25](#), [3.26](#) and [3.27](#)).

## The GIANT Tooth Mystery

*A fossil is the remains of any creature or plant that lived on the Earth many, many years ago. People have been finding fossils for thousands of years in rocks and cliffs and beside lakes. We now know that some of these fossils were from dinosaurs.*



Long ago, people who found huge fossils did not know what they were. Some thought the big bones came from large animals that they had seen or read about, such as hippos or elephants. But some of the bones people found were too big to have come from even the biggest hippo or elephant. These enormous bones led some people to believe in giants.

Hundreds of years ago in France, a man named Bernard Palissy had another idea. He was a famous pottery maker. When he went to make his pots, he found many tiny fossils in the clay. He studied the fossils and wrote that they were the remains of living creatures. This was not a new idea. But Bernard Palissy also wrote that some of these creatures no longer lived on earth. They had completely disappeared. They were extinct.

Was Bernard Palissy rewarded for his discovery? No! He was put in prison for his ideas.

As time went by, some people became more open to new ideas about how the world might have been long ago.



Then, in the 1820s, a huge fossil tooth was found in England. It is thought that Mary Ann Mantell, the wife of fossil expert Gideon Mantell was out for a walk when she saw what looked like a huge stone tooth. Mary Ann Mantell knew the big tooth was a fossil, and took it home to her husband.

When Gideon Mantell first looked at the fossil tooth, he thought it had belonged to a plant eater because

Fossil tooth sketched life-sized

it was flat and had ridges. It was worn down from chewing food. It was almost as big as the tooth of an elephant. But it looked nothing like an elephant's tooth.

Gideon Mantell could tell that the pieces of rock attached to the tooth were very old. He knew that it was the kind of rock where reptile fossils were found. Could the tooth have belonged to a giant, plant-eating reptile that chewed its food? A type of reptile that no longer lived on earth?

Gideon Mantell was really puzzled by the big tooth. No reptile that he knew about chewed its food. Reptiles gulped their food, and so their teeth didn't become worn down. It was a mystery.

Gideon Mantell took the tooth to a museum in London and showed it to other scientists. No one agreed with Gideon Mantell that it might be the tooth of a gigantic reptile.

Gideon Mantell tried to find a reptile that had a tooth that looked like the giant tooth. For a long time, he found nothing. Then one day he met a scientist who was studying iguanas. An iguana is a large plant-eating reptile found in Central and South America. It can grow to be more than five feet long. The scientist showed Gideon Mantell an iguana tooth. At last! Here was the tooth of a living reptile that looked like the mystery tooth. Only the fossil tooth was much, much bigger.



A life-sized drawing of an iguana's tooth from Gideon Mantell's notebook

Iguana



Now Gideon Mantell believed the fossil tooth had belonged to an animal that looked like an iguana. Only it wasn't five feet long. Gideon Mantell believed it was a hundred feet long! He named his creature *Iguanodon*. That means "iguana tooth".

Gideon Mantell did not have a whole *Iguanodon* skeleton. But from the bones he had collected over the years, he tried to figure out what one might have looked like. He thought the bones showed that the creature had walked on all four legs. He thought a pointed bone was a horn. He drew an *Iguanodon* with a horn on its nose.



What Gideon Mantell thought an Iguanodon looked like

Years later, several complete *Iguanodon* skeletons were found. They were only about thirty feet long. The bones showed that it walked on its hind legs some of the time. And what Gideon Mantell thought was a horn on its nose was really a spike on its "thumb"! Based on these discoveries, scientists changed their ideas about what the *Iguanodon* looked like.

Gideon Mantell made some mistakes. But he had made an important discovery, too. Since his first idea that the fossil tooth belonged to a plant-eating reptile, he spent many years gathering facts and evidence to prove his ideas were right. By making careful guesses along the way, Gideon Mantell was one of the first people to show that long ago, giant reptiles lived on earth. And then they became extinct.

Hundreds of years before, Bernard Palissy had been thrown in prison for saying nearly the same thing. But Gideon Mantell became famous. His discovery made people curious to find out more about these huge reptiles.

In 1842, a scientist named Richard Owen decided that these extinct reptiles needed a name of their own. He called them *Dinosauria*. This means "fearfully great lizard". Today we call them dinosaurs.



What scientists today think the Iguanodon looked like

**Table 3.14** Giant Tooth Mystery—Question 1: What is a fossil

Question	What is a fossil? a. the surface of rocks and cliffs b. the bones of a giant c. the remains of very old living things d. the teeth of elephants
Correct answer	c
Percentage of students who received full credit (international average)	75%
Process of comprehension	Focus on and retrieve explicitly stated information
Skills	To answer this question correctly, students need to read and understand the following sentence: “A fossil is the remains of any creature or plant that lived on the Earth many, many years ago.”
Vocabulary	Students who already know the meaning of the word “fossil” may have a slight head start in answering this question, but the answer can be taken literally from the text. Knowledge about the word “fossil” is therefore not necessary. Also, students need to know the meaning of the word “remains” to get an idea of what a fossil is, but again, this knowledge is not necessary to answer the question correctly.
Didactic suggestion	When students have trouble finding the answer in the text, reread the introduction of the text and rephrase the sentence that states what a fossil is out loud [explicit strategy instruction: monitoring and clarifying comprehension]. To illustrate this, show pictures of different types of fossils and talk about the characteristics of a fossil [in-depth interaction]. Before reading the rest of the text, it is recommended to orient on the text and talk about the pictures, the title, and what is said in the introduction: What could this text be about? What kind of text is it? What is the best way to read this text? [explicit strategy instruction: orienting on the text].

**Table 3.15** Giant Tooth Mystery—Question 2: Why people believed in giants

Question	According to the article, why did some people long ago believe in giants?
Correct answer	The response demonstrates understanding that people long ago believed in giants because they found huge bones/skeletons/fossils.
Percentage of students who received full credit (international average)	53%
Process of comprehension	Make straightforward inferences
Skills	To answer this question correctly, students need to interpret the following sentences: “But some of the bones people found were too big to have come from even the biggest hippo or elephant. These enormous bones led people to believe in giants.”

(continued)

**Table 3.15** (continued)

Didactic suggestion	Discuss the meaning of “too big to have come from....” “The bones were too big. They couldn’t be from a hippo or an elephant, because their bones are smaller than that. Can you imagine people thought the bones belonged to giants?” [in-depth interaction].
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**Table 3.16** Giant Tooth Mystery—Question 3: Where Palissy found fossils

Question	Where did Bernard Palissy find fossils? a. on the cliffs b. in the clay c. by a river d. on a path
Correct answer	b
Percentage of students who received full credit (international average)	71%
Process of comprehension	Focus on and retrieve explicitly stated information
Skills	To answer this question correctly, students should read the following sentence: “When he went to make his pots, he found many tiny fossils in the clay.”
Didactic suggestion	When students have trouble finding the information, suggest they reread the part about Bernard Palissy again. The information is explicitly mentioned in this part of the text [explicit strategy instruction: monitoring and clarifying comprehension].

**Table 3.17** Giant Tooth Mystery—Question 4: What was Palissy’s new idea

Question	What was Bernard Palissy’s new idea?
Correct answer	The response demonstrates understanding that Palissy’s new idea was that some fossils belonged to animals that no longer lived on earth, had completely disappeared, or were extinct.
Percentage of students who received full credit (international average)	25%
Process of comprehension	Interpret and integrate ideas and information
Skills	To answer this question correctly, students need to interpret the following sentences: “This was not a new idea. But Bernard Palissy also wrote that some of these creatures no longer lived on earth. ... They were extinct.” Students need to understand that “But Bernard Palissy also wrote...” contrasts with the previous sentence, and that the idea that the fossils came from extinct animals was new.

(continued)

**Table 3.17** (continued)

Didactic suggestion	Focus on the connectives: “but... also...” The word “but” indicates a contradiction (this <i>was</i> a new idea) and the word “also” refers to an addition (these fossils were not only the remains of living creatures, but they were also the remains of <i>extinct</i> creatures) [explicit strategy instruction: recognizing text structure]. If needed, discuss the meaning of the word “idea” in this text and that there could be more than one idea or explanation for a phenomenon [monitoring and differentiating].
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**Table 3.18** Giant Tooth Mystery—Question 5: Why Palissy was imprisoned

Question	Why was Bernard Palissy put into prison? a. people were not open to new ideas. b. he copied his ideas from Gideon Mantell. c. he left tiny fossils in his pottery. d. studying fossils was forbidden in France.
Correct answer	a
Percentage of students who received full credit (international average)	54%
Process of comprehension	Make straightforward inferences
Skills	To answer this question correctly, students need to interpret the part about Bernard Palissy and understand why his ideas were new and controversial for the time.
Background knowledge	Students should know how people reacted to controversial ideas hundreds of years ago.
Didactic suggestion	Start a conversation about Bernard Palissy’s new ideas and how people reacted to his ideas at that time if students have trouble understanding this part. Also, talk about how people would react to controversial ideas nowadays: Do we still put people into prison for having new ideas? What has changed? [in-depth interaction]. To elaborate on this topic, the teacher can offer other texts about certain controversial ideas of people in the past and present and about the freedom of speech [reading in a meaningful and functional context].

**Table 3.19** Giant Tooth Mystery—Question 6: Who found the fossil tooth

Question	Who found the fossil tooth in England? a. Bernard Palissy b. Mary Ann Mantell c. Richard Owen d. Gideon Mantell
Correct answer	b
Percentage of students who received full credit (international average)	68%

(continued)

**Table 3.19** (continued)

Process of comprehension	Focus on and retrieve explicitly stated information
Skills	To answer this question correctly, students should read the following sentences: “Then, in the 1820s, a huge fossil tooth was found in England. It is thought that Mary Ann Mantell ... was out for a walk when she saw what looked like a huge stone tooth.”
Didactic suggestion	Reread this part of the text with students and model how the information can be retrieved. Talk about who they thought found the fossil and what she did with it. Why did she take the fossil home? [explicit strategy instruction: monitoring and clarifying comprehension].

**Table 3.20** Giant Tooth Mystery—Question 7: What made the tooth puzzling

Question	What did Gideon Mantell know about reptiles that made the fossil tooth puzzling? a. reptiles had no teeth. b. reptiles were found under rocks. c. reptiles lived long ago. d. reptiles gulped their food.
Correct answer	d
Percentage of students who received full credit (international average)	57%
Process of comprehension	Make straightforward inferences
Skills	To answer this question correctly, students have to connect and interpret two parts of information: (1) He found a tooth that was worn down, and (2) all reptiles he knew gulped their food and therefore their teeth didn’t become worn down.
Didactic suggestion	Make a schematic visualization of this part of the text, for example, by drawing a picture of Gideon Mantell with two thinking clouds that show the two parts of information that made the tooth puzzling [explicit strategy instruction: visualizing]. Also, model how to make a connection between the worn down tooth and the fact Gideon didn’t know any reptile that could have worn down teeth [explicit strategy instruction: making connections].



**Table 3.21** Giant Tooth Mystery—Question 8: Which animal did the tooth belong to

Question	Gideon Mantell thought the tooth might have belonged to different types of animals. Complete the table to show what made him think this.		
Correct answer	Type of animal	What made him think this	
	A plant eater	The tooth was flat with ridges	
	A giant creature	The response identifies the large size of the fossil tooth (as big as an elephant’s tooth)	
	A reptile	The response indicates that:	
		1) The rock in which it was found was the kind of rock where reptile fossils were found/it was found where reptiles had lived.	
		2) The fossil tooth was similar to/looked like an iguana/reptile tooth.	
	Partial credit may be given to students who correctly filled in one of the parts of this item.		
Percentage of students who received full credit (international average)	12%	Percentage of students who received partial credit (international average)	38%
Process of comprehension	Interpret and integrate ideas and information		
Skills	To answer this question correctly, students need to interpret the part where Gideon was puzzled by the big tooth. They have to find the arguments in the text that argue that the tooth belonged to a giant creature or to a reptile.		
Didactic suggestion	Divide the students into pairs and set up a discussion about who the tooth belonged to. One of the students argues the tooth belongs to a giant creature; the other one argues the tooth belongs to a reptile. “What arguments do you have? Think about what you have read in the text.” Make sure the students formulate complete arguments related to the text [in-depth interaction]. For students who have trouble finding the arguments, model how to recognize certain relationships within the text, for example, by selecting the connectives “but,” “and so,” and “only” [explicit strategy instruction: recognizing text structure]. Students can also make a more extensive table together of several characteristics of the different types of animals. For this they can look up additional information in other texts, for example, in a biology textbook [integrating reading education with other subjects].		

**Table 3.22** Giant Tooth Mystery—Question 9: Why Gideon took the tooth to a museum

Question	Why did Gideon Mantell take the tooth to a museum? a. to ask if the fossil belonged to the museum b. to prove that he was a fossil expert c. to hear what scientists thought of his idea d. to compare the tooth with others in the museum
Correct answer	c
Percentage of students who received full credit (international average)	58%
Process of comprehension	Make straightforward inferences
Skills	To answer this question correctly, students need to interpret the following sentences: “Gideon Mantell took the tooth to a museum in London and showed it to other scientists. No one agreed with Gideon Mantell that it might be the tooth of a giant reptile.” Students need to infer that the second sentence points to sharing ideas.
Didactic suggestion	Reread this part of the text and model out loud by asking questions about how you interpret it. “He showed the tooth to the other scientists, and no one agreed with Gideon. How can they disagree? Do they know about his ideas? Gideon must have told them about his ideas.” [explicit strategy instruction: asking questions].

**Table 3.23** Giant Tooth Mystery—Question 10: Why seeing the tooth was important

Question	A scientist showed Gideon Mantell an iguana tooth. Why was this important to Gideon Mantell?
Correct answer	The response demonstrates understanding that the iguana tooth provided evidence that supported Gideon Mantell’s theory that the fossil tooth might have belonged to a giant reptile. Or, the response demonstrates a more general understanding that the iguana tooth looked like the fossil tooth.
Percentage of students who received full credit (international average)	34%
Process of comprehension	Interpret and integrate ideas and information
Skills	To correctly answer this question, students need to integrate the information in the previous part of the text (where Gideon thought the tooth belonged to a giant reptile and was looking for evidence for that theory) and the information in the part of the text where he saw an iguana tooth that looked like his mystery tooth.
Vocabulary	Students need to know what an iguana is. Besides the explanation in the text (a large plant-eating reptile), they can look at the picture to learn what an iguana is or search for other pictures of iguanas in books or on the internet.

(continued)



**Table 3.23** (continued)

Didactic suggestion	Summarize together what students know about Gideon and the tooth so far, for example, by asking questions: What is Gideon’s theory about the mystery tooth? Who does he think this tooth belongs to? Is he sure about that? So, he’s looking for evidence? Finally, he found a tooth that looks like his mystery tooth! [explicit strategy instruction: asking questions and summarizing].
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**Table 3.24** Giant Tooth Mystery—Question 11: What Gideon used to figure out what the Iguanodon looked like

Question	What did Gideon Mantell use when trying to figure out what the Iguanodon looked like? a. Bones he collected b. Ideas from other scientists c. Pictures in books d. Teeth from other reptiles
Correct answer	a
Percentage of students who received full credit (international average)	57%
Process of comprehension	Focus on and retrieve explicitly stated information
Skills	To answer this question correctly, students should read the sentence “But from the bones he had collected over the years, he tried to figure out what one might have looked like” and imagine how he used the bones to find out what the Iguanodon looked like.
Didactic suggestion	If students have difficulty imagining how to use bones to mimic the appearance of an animal, show pictures of skeletons and talk about how to find out what an animal looks like based on his skeleton [explicit strategy instruction: visualizing].

**Table 3.25** Giant Tooth Mystery—Question 12: Purpose of two Iguanodon pictures

Question	<p>Look at the two pictures of the Iguanodon. What do they help you to understand?</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>
Correct answer	The response demonstrates understanding that the pictures in the text show the changes in scientific ideas, or that the pictures show different people’s ideas about the Iguanodon. The response may also indicate that the pictures illustrate the mistakes that Gideon Mantell or other people might have made.

(continued)

**Table 3.25** (continued)

	For partial credit, the response demonstrates an understanding that the Iguanodons looked different in the two pictures, or the response describes a difference between the two pictures without reference to changes in scientific ideas or what different people might have believed. The response may also provide an explicit reference to one of the pictures without reference to changes in scientific ideas of what different people might have believed.		
Percentage of students who received full credit (international average)	10%	Percentage of students who received partial credit (international average)	22%
Process of comprehension	Examine and evaluate content, language, and textual elements		
Skills	To answer this question correctly, students need to understand that the two pictures reflect the Iguanodon as Gideon thought it looked like, and as present-day scientists think it looked like and that there are differences between the two appearances of the Iguanodon.		
Didactic suggestion	Place these two pictures side by side and together read the text about the Iguanodon as Gideon thought it looked like and as scientists today think it looked like. While reading, relate the text to the pictures and discuss the differences between the two drawings [in-depth interaction]. Also, by summarizing the last two pages of the text together in pairs or small groups, students gain more insight into the function of the two pictures. Each group member contributes to the summary by adding important information or providing feedback. Help students summarize by asking questions about the text or model how to summarize [explicit strategy instruction: summarizing].		

**Table 3.26** Giant Tooth Mystery—Question 13: What the Iguanodon looked like

Question	Later discoveries proved that Gideon Mantell was wrong about what the Iguanodon looked like. Fill in the blanks to complete the table.		
Correct answer	What Gideon Mantell thought the Iguanodon looked like	What scientists today think the Iguanodon looked like	
	The Iguanodon walked on four legs	The Iguanodon (sometimes) walked/ stood on two/hind legs	
	The Iguanodon had a horn (on its head/face/ nose) OR, the spike was on its head/face/nose	The Iguanodon had a spike on its thumb	
	The Iguanodon was 100 feet long	The Iguanodon was 30 feet (9 meters) long	
	Partial credit may be given to students who correctly filled in one or two of the parts of this item.		
Percentage of students who received full credit (international average)	32%	Percentage of students who received 2 points (international average)	46%
	Percentage of students who received 1 point (international average)		59%

(continued)

**Table 3.26** (continued)

Process of comprehension	Interpret and integrate ideas and information
Skills	To answer this question correctly, students need to interpret the descriptions of what Gideon thought the Iguanodon looked like and what present-day scientists think the Iguanodon looked like and compare these descriptions. They must also document this information in the relevant spaces in the answer grid. The pictures in the text can help in imagining the appearance of the Iguanodon.
Didactic suggestion	Students can work in pairs and discuss the differences and similarities of the two Iguanodon. They can make a Venn diagram to structure the differences and similarities in an organizer. To help students create such a diagram, teachers can fill in one or two differences and similarities in advance [in-depth interaction]. Help students who struggle in finding the differences and similarities in the text by modeling how to interpret and compare the information in the text [monitoring and differentiating].

**Table 3.27** Giant Tooth Mystery—Question 14: What discovery proved Gideon wrong

Question	What were found that showed Gideon was wrong about what the Iguanodon looked like? a. more fossil teeth b. scientific drawings c. living <i>Iguanodons</i> d. whole skeletons
Correct answer	d
Percentage of students who received full credit (international average)	52%
Process of comprehension	Make straightforward inferences
Skills	To answer this question correctly, students need to interpret the following part of the text: “Years later, several complete Iguanodon skeletons were found. ... Based on these ideas, scientists changed their ideas about what the Iguanodon looked like.”
Vocabulary	Students need to know the meaning of the word “skeletons.” This can be clarified by showing different pictures of skeletons, for example of a human or of a well-known animal.
Didactic suggestion	Read this part of the text out loud and model asking questions in order to better comprehend this part: What was thirty feet long? Who walked on his hind legs? [explicit strategy instruction: asking question]. Suggest creating a timeline to record the various information in the text about Bernard Palissy’s ideas, Gideon’s theory, and scientific discoveries in time. This shows how the information we have about dinosaurs got better and more specific over time. New information from other texts could also be added. Per group of students, for example, information can be found about one extinct animal: In what era did this animal live? What did it look like? Did people’s understanding about the animal change over time? [explicit strategy instruction: visualizing].

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