



Chasing Vermeer A Lesson for Third and Fourth Graders

by Maryann Wickett

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In Blue Balliett's novel Chasing Vermeer (Scholastic, 2005), Petra and Calder, the main characters, are in the same class but barely know each other. Their friendship grows, however, and they work together to recover a stolen painting—a valuable Vermeer. Pentominoes are included in the clues they need to decode. Maryann Wickett uses this book as a springboard for a lesson in which students visualize geometric shapes, create all possible five-piece pentomino arrangements, and then go on to two other activities involving pentominoes.

I began by reading aloud to my class of third and fourth graders the two introductory pages from *Chasing Vermeer*—"About Pentominoes and About the Story" and "About the Artwork: A Challenge to the Reader"—and then asked students for their reactions.

"Sounds like a mystery to me," Traci said. "It's mysterious when the author says, 'Pentominoes, like people, can surprise you.' I don't even know what pentominoes are."

"I bet we'll find out! Otherwise there wouldn't be a special page about them," commented Sara.

"Pentominoes can make a code! That's cool," Greg said.

When all who wanted to had shared their reactions, I read aloud the novel's first two chapters. At times the students insisted on sharing their reactions, especially as three letters asking for the receiver's help were mysteriously delivered to three as yet unknown recipients.

We carefully examined the illustration on page 5, looking for a certain living creature that might help us discover the hidden message described in the introductory pages. I had two copies of the book so the students were able to gather round and see more easily. After a few moments, Carlos said, "Hey, look, there are two frogs! Maybe that's the creature."

Vanessa carefully examined the bottom illustration on page 5, pointed to the envelope in the woman's hand, and said, "That L on the envelope could be a pentomino piece." We quickly checked the introductory pages and verified that the L-shaped figure Vanessa noticed could be the V pentomino piece.

I said, "Hmm, two frogs and the V. Very interesting. I wonder what it all means. Are they clues?"

Next, I provided students with 1-inch tiles and 1-inch graph paper so each could make his or her own set of pentominoes. I explained that pentomino pieces were made of five tiles and whenever two sides touched, they had to match exactly. I drew on the board two samples—one that was considered acceptable and another that wasn't.



This activity had two purposes: first, to provide students with experiences visualizing geometric arrangements and, second, to have students figure out when all twelve possible arrangements had been found, which requires logical thinking. As students worked, I circulated, observing their work and asking questions.

When students felt they had all possible arrangements, I asked them to verify this. Trevor and Betsie used their tiles to demonstrate how they first built a straight line of five tiles. Then they moved the top tile around the other four tiles, recording all the possible arrangements.

Bonnie watched as they explained what they had done. She noticed, however, that some arrangements were the same if they were flipped or rotated. Bonnie's observation took Trevor and Betsie by surprise, and they began to explore further which of their pentomino arrangements, if flipped or rotated, were duplicated. It took the remainder of the period for the children to complete their sets of pentominoes.

Day 2

I reread the second paragraph of page 13 of *Chasing Vermeer*. As Calder had done in this paragraph, I challenged the students to use their pentominoes and work with a partner to find possible six-piece pentomino rectangles. When students found a way to make a six-piece rectangle, I gave them the choice of finding another way or trying to discover how to use all twelve of their pentominoes to make a rectangle.

I left enough time to read aloud Chapters 3 and 4 and to carefully examine the illustrations for other hidden frogs and pentomino pieces. The students found a frog in the illustration on page 29 but no pentomino. Chapter 4 showed Calder with his pentominoes spread out on his desk but no frogs. When Calder pulled the P pentomino from his pocket on page 24, he noticed Petra walking in front of him. Anya commented, "Hey, P is for *Petra* and for *pentomino*."

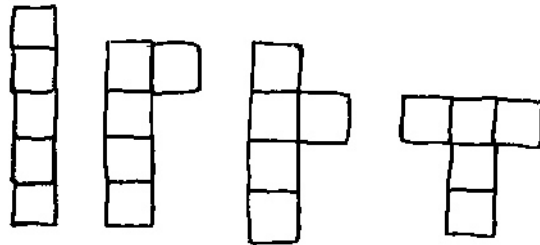
Mark added, "I think Calder's last name starts with P too." We looked back to the previous page, page 23, and confirmed that Calder's last name, Pillay, did start with P.

"Hey, that's weird," Miguel said. "It's like all these pieces of the story are being linked by pentominoes, just like it said at the very beginning." (Miguel was referring to the following quote from the introductory page, "About Pentominoes and About This Story": "This book begins, like a set of pentominoes, with separate pieces. Eventually they will all come together.") Several others nodded in agreement.

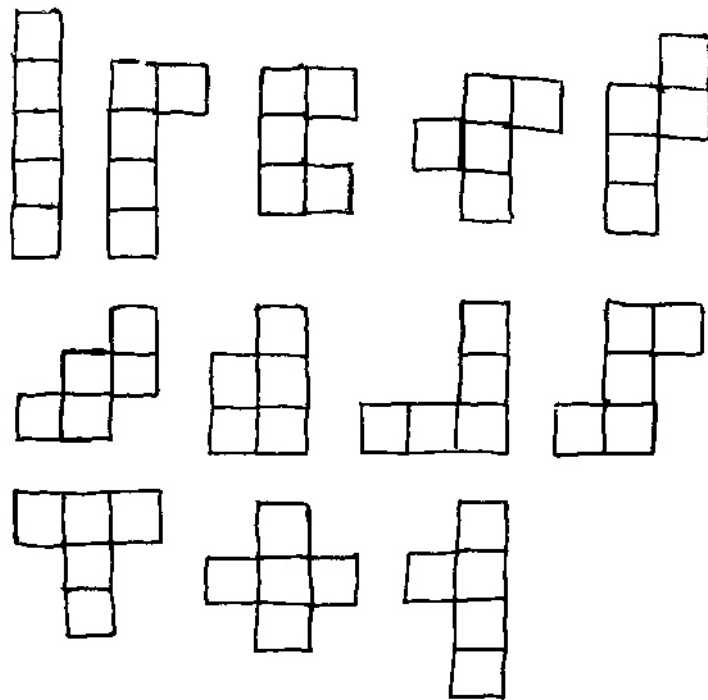
Day 3

I started class by reading Chapter 5. The students noticed immediately that the fur collar illustrated on page 48 had both a pentomino and a frog. To give students more experience with

the pentomino pieces so it would be easier to spot them in the illustrations, I asked the children to get their pentominoes and sit on the floor so they could see the pentomino pieces and the tiles I had put in front of me on the floor. I gave them the following challenge: "Arrange your pentomino pieces into a line, so that only one square needs to be moved to change a shape into the one next to it." I explained that the tiles could be useful for helping them think about the challenge. I used the tiles to quickly demonstrate the instructions.



The students worked in pairs and came up with several solutions. As they shared their solutions, I recorded them on a class chart.



I ended the class by reading Chapter 6. This was very exciting because on page 57, there is a code involving pentominoes and some messages to be decoded. The students were eager to decode the messages. I told them I would post the code and the messages for the next day.

We continued to return to the book often over the next several weeks. We found other messages to decode, made up our own codes, examined the illustrations, searching for frogs and pentominoes, noticed many odd coincidences, looked for pentomino shapes in the world

Chasing Vermeer, continued

around us, discovered that the number twelve was important to the story, and tried to figure out the message in the illustrations. There are additional ideas for math activities in the back of some of the editions of the book as well as online at www.scholastic.com/chasingvermeer.