come up with headlines to capture some aspect of the topic at hand. Karrie also noticed students were making reference to each others' headlines when trying to express their own thinking, sometimes even days after the headlines had gone up on the classroom wall. In these ways, the curriculum became more accessible for all learners. Over time, all students felt comfortable enough to interact with the group's collective thinking via headlines.

Having worked to make her students' thinking visible in both fifth and sixth grades, Karrie wondered what students would take with them upon leaving her classroom. So a year after students had left her, Karrie arranged to meet her former students and asked them about what sorts of thinking they continued to make use of in their new classes. Several students made mention of the Headlines routine in particular, Karrie noted. Often this occurred in learning scenarios unprovoked by the teacher. For example, one former student mentioned that when he comes across a particularly challenging test question on a districtwide assessment, he often asks himself, "So what would a headline be for this topic?" to see if that helps him figure out a problem or response. Another student reported that when she listens to her soccer coach explain a new strategy or skill, she often considers, "What's the headline here?" to picture what is at the core of her coach's instructions. If something remains puzzling for her, this student reported that she uses the headline in her mind to frame the question to ask her coach.

9

CSI: COLOR, SYMBOL, IMAGE

Think of the big ideas and important themes in what you have just read, seen, or heard.

- Choose a *color* that you think best represents the essence of that idea.
- Create a *symbol* that you think best represents the essence of that idea.
- Sketch an *image* that you think best captures the essence of that idea.

The CSI: Color, Symbol, Image routine emerged from our desire to make students' thinking visible in a way that didn't rely so heavily on the use of written or oral language. Having worked intensively with a number of international schools in which students are often learning in a new language, teachers shared with us the need for such routines. Similarly, teachers of young students felt that the lack of language facility sometimes made it difficult for their students to adequately express their thinking. The idea of using colors, symbols, and images taps into students' natural creativity and desire for expression. At the same time, it pushes students to make connections and think metaphorically.

Purpose

This routine asks students to identify and distill the essence of ideas—taken from their reading, viewing, or listening—in nonverbal ways by using a color, symbol, and image to represent the big ideas they have identified. In making these selections, students are pushed to think metaphorically. Metaphors are a major vehicle for developing our understanding of ideas as we connect something new to something we already know by identifying similarities and making comparisons. Put simply, a metaphor is a connection between one thing and another. "This is like that because . . . ," "This idea reminds me of or makes me think of this because . . ."

CSI can be a great way to enhance student comprehension and develop metaphorical thinking. However, there is no need to introduce the formal terminology of metaphors and similes, though this might be discussed with older students. Keep in mind that the connections students make are highly personal and need to be understood in terms of the individual's explanation. For example, one student may choose black to represent an idea because to them black represents possibility and the unknown, whereas another

student may associate blue with the exact same idea because blue reminds him of the openness of the sky and infinite freedom and possibility.

Selecting Appropriate Content

Select a rich piece of content that has a variety of interpretations and meaning. Don't shy away from complexity, ambiguity, and nuance. There has to be something to interpret and discuss. The content might be a personal essay, a chapter from a piece of literature, a poem, a provocative speaker, radio essay, or short film. The content shouldn't be too long nor have too many competing ideas contained in it, however. Therefore, a single chapter in a book or even a passage is often preferable to the whole text. Select something that you want your students to interpret and think that their interpretations will give you insight into their understanding of that content.

Steps

1. *Set up.* After students have read a passage from a book, listened to a speaker, or viewed a video, have them think about the core ideas and make note of things that they find interesting, important, or insightful. They can do this individually or, if this is the first time introducing the routine, you might want to generate a class list of the various ideas people identified.

2. *Choose a color.* Each student selects a color that he or she feels represents the core ideas he or she has identified in the piece of content being explored. In most cases a single color should be chosen by each student. This color is recorded and, when age-appropriate, students explain and justify their choices in writing.

3. *Create a symbol.* Each student selects a symbol that he or she feels represents the core ideas he or she has identified in the piece of content being explored. A symbol is a thing that stands for something else. For instance, a dove stands for peace, the = sign stands for the concept of equality. If you look at your computer dock, you will see a variety of icons that stand for various programs or functions. The symbol is recorded and, when age-appropriate, students explain and justify their choices in writing.

4. *Sketch an image.* Each student selects an image that he or she feels represents the core ideas he or she has identified in the piece of content being explored. An image is like a photograph or drawing of a scene. Students need not worry about their drawing abilities, as they can simply complete a simple sketch that captures the idea of what is in the image. This sketch is recorded and, when age-appropriate, students explain and justify their choices in writing.

5. *Share the thinking.* Working with a partner or in a group, each student shares his or her color and tells why he or she made that choice. How did it connect to the passage or content the class is trying to understand? How does that color connect to the big ideas just read, heard, or seen? Repeat the sharing process until every member of the pair or group has shared his or her color, symbol, and image and explained the selections.

Uses and Variations

In her second grade classroom, Emma Furman at Bialik College decided to use CSI as a tool to help her students reflect on the upcoming school year. She asked them to think about what being a second grader meant to them and what color they might give "second grade." She then asked them to think of what kind of symbol they would pick to stand for being in second grade versus being in first grade or being in third grade. How was this year going to be different? Finally she asked them to draw pictures that for them represented their hopes about second grade.

As Joan in Hobart, Tasmania, began reading a new chapter book aloud to her fifth graders she made the decision to try the CSI routine as a whole class but to modify it to focus just on the choice of color. Using a class list, she created a table in which each student's name was assigned a row and twelve columns were created to correspond to the number of chapters in the book. After reading each chapter, the sheet was passed around the class and each student selected a color to fill in beside his or her name in the column corresponding to the chapter. Once the sheet was completed, a short class discussion ensued in which students were invited to explain and justify their choices to the rest of the class. The sheet was then posted on the bulletin board until it was needed again. What resulted was a patchwork display that provided a sense of the character of each chapter as well as the individuality of each student.

You can watch Melyssa Lenon using the CSI routine with her secondary chemistry students at Chesaning Union High School in Michigan on the DVD. Melyssa's students use the routine to capture the essence of the concept of stoichiometry, a branch of chemistry dealing with understanding and representing the quantitative relationship that exists among reactants and products in chemical reactions. Melyssa had spent a lot of time on the procedures involved in figuring out these relationships and used CSI to draw students' attention back to the broader concept.

Assessment

In students' selection of colors, symbols, and images, look for their ability to capture the essence of the stimulus from which they are working. Although this might be partially

evident in their selection, it is their explanations of their choices that provide more insight. Why did a student choose that color or create that image? How does it connect with the big ideas of the stimulus? In helping to advance students' thinking, you will also want to look at the quality of the metaphors they are choosing. Initially, students may make very obvious choices, such as black for sadness, a sun for happiness, or a literal drawing of a scene from the story. You'll want to look for and ask students to provide metaphors that go beyond the obvious and that help us to understand the ideas on a deeper level. See Nathan Armstrong's example in the Picture of Practice following for an example of how this can be done.

Tips

Though the routine specifies color, symbol, and then image, it is not necessary to do them in that order. Depending on the content and the individual, some students may find it easier to start with the image while others may have a symbol that immediately comes to mind. Since the point of the routine is to encourage metaphorical thinking, making connections, and distilling the essence, don't place too much emphasis on the actual drawing of the image. While younger students might enjoy this diversion, it can be a distraction from the thinking if it is allowed to become the focus of the activity. Older students might even prefer to describe their images in words rather than draw them. Students can also complete the routine effectively on the computer by "filling" a box using the color palette, using the "Insert symbol" function as a source for symbols, and searching "Google images" to find a picture.

A Picture of Practice

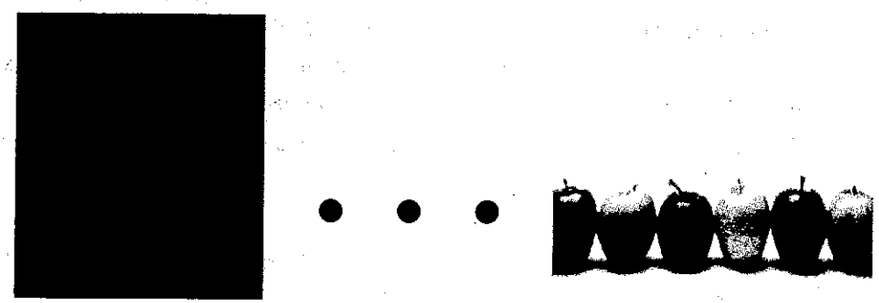
As one of his and their first attempts at using a thinking routine, Nathan Armstrong decided to try out the CSI routine in his seventh grade English class at Wesley College in Melbourne. Nathan's students were reading Anne Frank's *Diary of a Young Girl* at the time. After beginning the book in class, the remainder of the book became assigned reading over the school holiday. To be sure that students were actively engaging with the text and that they would be prepared for a rich discussion when they returned to school, Nathan decided to use the CSI routine. He assigned students the task of doing the routine for five of Anne's diary entries.

Students would do the routine using a basic computer template of three boxes arranged across the sheet in landscape mode. Each box would hold a color, a symbol, or an image. Students would search for images on the Internet, use symbols from the "Insert symbols" function, and fill in the box with a color using "Fill color." Below each box students would write brief explanations to justify their choices (see Figure 5.3).

When students returned from the school holiday, the room was turned into a gallery of their work as students posted their five CSI routines. Students hung up their routines according to diary entry, so that the front wall became a visual representation of the entire text chronologically arranged. Since students made their own selection of which entries from Anne's diary to interpret, many of the diary entries had multiple CSI representations. Discussion quickly broke out regarding the various ways in which students interpreted the text, noting both similarities as well as differences in the colors, symbols, and images selected.

Nathan's goal for using CSI had been to give students a chance to develop a deeper understanding of the text. He felt the choices students made about their colors, symbols, and images along with their explanations accomplished this. At the same time, it provided him with a good sense of their understanding. Reflecting on students' work, Nathan noted that some of students' metaphorical choices were more sophisticated than others. This led to a class discussion about what makes a

Figure 5.3 Alexandra's CSI Routine for *The Diary of a Young Girl*



Color	Symbol	Image
Anne is unsure of what the future will hold for her and Peter. Black, like a chalkboard, represents all the different possibilities that could be drawn for their future.	In this diary entry Anne doubts she can keep her longing to reach Peter under control. She must wait until the silence breaks between them and they can act as their true selves.	Through this passage Anne talks about how she and Peter aren't really as different as they seem on the surface. Just like these apples, they look different but taste similar.

good metaphor. Students shared that some metaphors seem obvious and almost literal, like a road to symbolize a journey or a tree to stand for growth, while other metaphors were more complex, like a water droplet representing the idea of feeling simultaneous separation and integration since a water droplet has its own uniqueness but at the same time gets lost once it is combined with other droplets.

Based on these discussions about the degree of complexity and sophistication of metaphors, Nathan decided to push students' metaphoric thinking. Working with a subsequent text, Nathan drew a selection of random and varied objects and asked students to relate them to the text as possible images: "How might these drawings fit what we have just read as possible CSI images?" As students discussed and justified how the objects Nathan had drawn might connect to the text, they were developing their ability to create rich metaphors by connecting features of the text to features of the images.

With this initial experience using the CSI routine and thinking deeply about metaphors behind them, Nathan developed a scaling system for evaluating the quality of the metaphors students created. This "metaphoric level" was a continuum on a scale of 1 = low to 10 = high. Students used this scale to self- and peer assess as they continued to use the CSI routine throughout the year. During these sessions, Nathan continued to modify the routine to meet his needs and push students' thinking. Sometimes students were put in groups to do the CSI routine, thus requiring them to discuss and evaluate their choices of color, symbols, and images with their peers. To further extend students, Nathan sometimes asked for a quote from the text to be given to accompany students' choices. In this way, students were forced to justify the big ideas and themes they identified.

GENERATE-SORT-CONNECT-ELABORATE: CONCEPT MAPS

Select a topic, concept, or issue for which you want to map your understanding.

- *Generate* a list of ideas and initial thoughts that come to mind when you think about this topic or issue.
- *Sort* your ideas according to how central or tangential they are. Place central ideas near the center and more tangential ideas toward the outside of the page.
- *Connect* your ideas by drawing connecting lines between the ideas that have something in common. Explain and write on the line in a short sentence how the ideas are connected.
- *Elaborate* on any of the ideas or thoughts you have written so far by adding new ideas that expand, extend, or add to your initial ideas.

Over the years we have collectively looked at thousands of concept maps from students around the world. Regardless of the topic, one thing that we noticed was that, by and large, students don't make very good concept maps. This set us pondering over what kinds of thinking one needs to do in order to create a concept map that would both help one to organize one's thinking and ideas as well as to reveal how one understands a particular concept. The Generate-Sort-Connect-Elaborate (GSCE) routine was the result.

Purpose

Concept maps help uncover a learner's, mental models of a topic in a nonlinear way. Concept maps help us to activate our knowledge of a topic and then connect those ideas in a meaningful way. Learners often find that making a concept map helps them to organize their thinking and illuminate how ideas relate to one another. This can help to solidify one's thinking and understanding as well as to reveal that thinking to others. Of course, educators and researchers have long used concept maps for this purpose. However, for a concept map to be truly revealing of the mental model or conceptual understanding a person holds, it is helpful to structure the process of creating a concept map, not to constrain the thinking but to actively foster