CHAPTER 5

THINKING ROUTINES:
CREATING THE SPACES AND STRUCTURES FOR THINKING

As a student teacher struggling to master the mysteries of life inside a classroom, I would spend hours pouring over books and resources to devise what I hoped would be interesting and engaging lessons for the second graders in my charge. Although this planning was important, and certainly necessary to my overall professional development, it prepared me less for assuming responsibility for a classroom than I imagined. No, my best preparation for stepping into the role of teacher didn't come from devising interesting lessons or designing bulletin boards, but from the time I spent watching and learning the routines of the classroom of which I was about to take charge.

There was a certain way we did things in Mrs. Barker's second grade, and I, probably more than any of the students, didn't want to violate those rules of operation. I paid careful attention to how students were expected to line up, the way the day began, how and when students were allowed to talk, what movement was and was not allowed, how papers were passed out, which responsibilities were considered perks and which were deemed punishments, how materials were to be used and stored, and how we moved from one activity to another. All this watchfulness took place in anticipation of the day that I would take over the class and be the one responsible for both initiating and reinforcing those routines. Looking back, I can see that the lessons I taught in Mrs. Baker's room frequently missed the mark—either because they were too ambitious and sprawling or because they were not directed to reach students where they were in their learning. However, because I had mastered the routines of the classroom, I generally was able to sustain a learning environment that allowed me to rebound from my mistakes and to make the necessary mid-course corrections needed to move forward.

Routines clearly play an important role in ordering and structuring the lives of the group of individuals coexisting in a small space known as a classroom. Anyone who has spent time in classrooms can attest to this. However, for teachers concerned with developing intellectual character, the importance of routines extends beyond a managerial function. Through specifying the guidelines by which learning interactions take place, routines act as a major enculturating force communicating the values of a classroom. Routines not only give a classroom a sense of order and smoothness, but also contribute to its unique feel as an environment for learning. In this chapter, we look more closely at how routines act to orchestrate the intellectual space of the classroom and support the development of students' intellectual character. We first examine the general nature of routines and their various types before focusing on one particularly powerful type of

routine, thinking routines, that teachers use to scaffold students' dispositional development.

THE FORM AND FUNCTION OF ROUTINES

What makes something a routine? How is a classroom routine different from other types of routines we are likely to run across in our lives—such as routines for brushing our teeth, grocery shopping, or planning a vacation? These everyday routines might be better thought of as rituals or habits since they tend to emerge slowly over time from our well-developed patterns of behavior. As rituals or habits, these practices tend not to be adopted explicitly nor are they necessarily tailored to meet their ends in the most efficient manner. In fact, "our way of doing things" often speaks more of preference and familiarity than of efficiency. In contrast, classroom routines tend to be <u>explicit</u> and <u>goal-driven</u> in nature. Their adoption usually represents a deliberate choice on the part of the teacher. Rather than emerging over time, classroom routines are more likely to be designed and taught overtly. Routines are crafted to achieve specific ends in, what is generally expected to be, an efficient and workable manner. Whereas rituals and habits can be carried out without our full awareness, classroom routines tend to be well known by all participants. To test this proposition, walk into any classroom and ask the students, as well as teacher, to tell you about the routines they use for passing out papers, lining up, speaking in class, etc.

The explicit and goal-driven nature of classroom routines leads us to a variety of additional features of routines. For instance, to keep them useful and efficient, routines tend to have only a <u>few steps</u>. Since everyone needs to quickly go about the tasks of lining up for lunch, passing out books, getting themselves into cooperative groups, or beginning a class, lengthy or complicated procedures are counterproductive. By having only a few steps, routines are <u>easy to learn and teach</u>. They can almost always be introduced and reinforced in context without need for extensive elaboration or pedagogy. When students fail to carry out routines fully or successfully, they can also be quite <u>easily scaffolded</u> by simply reminding or prompting the students to carry out the next step. Finally, to achieve their ends in efficiently directing a common behavior or task, routines have to be <u>used over and over</u> again so that they become ingrained and can be activated quickly in an almost automatic way. All these features of routines help us not only identify routines at work in the classroom, but also better understand how particular routines operate in context. We explore how each of these features apply to thinking routines in more depth a

bit later, but first we need to make a distinction between thinking routines and the other types of routines at work in a classroom.

Classroom routines can be grouped into four broad categories: housekeeping, management, discourse, and learning (Leinhardt & Greeno, 1986; Leinhardt, Weidman, & Hammond, 1987).[i] <u>Housekeeping</u> routines manage movement and physical materials within the classroom. For example, students might be required to raise their hands and ask permission before using the pencil sharpener, to put their book bags in a certain location, or to line up in a particular fashion. In short, housekeeping routines represent rules and guidelines for living and working together as a group. <u>Management routines</u> help students prepare for learning. They include such things as getting papers passed out, forming groups, coming to attention, and preparing for a discussion. For instance, at the beginning of a lesson, the teacher might assign one student from each table to go to the shelf and collect books for everyone at the table and then appoint another student to return them. Primary teachers often using a clapping pattern to call students back to attention. This is a management routine in that its effect is to prepare students for the next episode of learning but is not a strong learning moment in and of itself.

<u>Discourse routines</u> orchestrate conversations between teachers and students. Examples include the norms for a class discussion, raising one's hand before speaking, procedures for listening and responding to the contributions of others, and guidelines a teacher might establish for the "author's chair" time in writers' workshop. Currently, many teachers have begun to use conversation protocols in their professional conversations with colleagues as a way to help them look at and understand student work.[ii]   These protocols are a specific type of routine. Finally, <u>learning routines</u> focus students' attention on the specific topic being studied. They could take the form of reading the lesson in the textbook, answering the questions that follow the reading, and checking in with the teacher if there are any problems. Other examples include the use of journals or note-taking procedures, a classroom debate about the interpretation of a passage, or procedures for reviewing and discussing homework.

In all cases, the routines described above are instrumental in nature. They are designed to achieve specific goals in an efficient and productive manner. Since teachers need to get students attention repeatedly throughout the day, it is useful to establish a routine for doing so. Likewise, because classes regularly engage in discussion, go over homework, line up, and gather information from texts, these tasks

can be routinized. As seen in the examples above, routines tend to have only a few steps, are easy to learn and teach, can be easily scaffolded, and are used over and over again.

THINKING ROUTINES: A SPECIAL TYPE OF ROUTINE[iii]

Although thinking routines have many similarities to other classroom routines, they differ qualitatively from these other types of routines in an important way. Whereas most routines direct overt behavior, thinking routines direct and guide mental action. We might view thinking routines as a particular subset of discourse or learning routines since learning or the discussion of ideas is the larger goal. But, you might ask, don't all learning or discourse routines involve thinking? Unfortunately, the answer is no. It is quite natural for a learning routine to involve thinking, but it doesn't have to do so. There can be nonthinking or thinking-minimal learning routines that seek to direct students' actions toward learning or discourse but do little to activate and support students' mental efforts.

What does it mean to have a routine designed to support learning but not necessarily support thinking? Here's an example: a teacher establishes the routine of reading each new book chapter in a round-robin fashion. This routine's purpose is to help students to learn and is, thus, classified as a learning routine—regardless of its effectiveness. However, it is not a thinking routine because the practice, while it might involve thinking for some students, does not serve to encourage or actively support students' thinking. It is up to the students themselves to activate their own thinking in this situation. Doing so will certainly have benefits, and the teacher might even expect that such activation will take place. However, the routine itself does little to support or encourage mental engagement.

Now, let's look at the flip side of this situation. What would a thinking-rich learning routine look like?   Before beginning a new science unit, a teacher might have her students collectively brainstorm all of the things they know about the topic and how they think it connects to other areas of science they have studied. This brainstorm might take the form of a class web or a list. This is the way the teacher regularly begins new units, and the class knows the process and can easily participate in the practice without much additional guidance. Such a practice would be classified as both a learning and a thinking routine. The larger purpose of the routine is still learning, but now the routine is targeted to actively encourage, involve, and support students' thinking.   Specifically, the brainstorming and webbing routines

facilitate students' connection making, generation of new ideas and possibilities, and activation of prior knowledge. The odds are that any student involved in the routine will be involved in these types of thinking as well.

Thinking routines generally adhere to the same criteria and have the same features as the other routines already discussed. These criteria were described above in relation to housekeeping, management, discourse, and learning routines, but what do they look like when applied to thinking routines? How can these criteria help us understand and uncover examples of thinking routines as we look at our own practice and that of others?

We initially distinguished routines from habits or "ways of doing things" by talking about their explicit and instrumental nature. That is, routines are known by the group of learners and are designed to serve a specific purpose. The explicit nature of thinking routines is evidenced by their having names or labels—such as brainstorming, webbing, pro and con lists, KWL—that allow us to easily recall them and put them in play. At the broadest level, thinking routines are purposeful because their overriding goal is to encourage, involve, and support thinking. But they serve more specific purposes as well. For example, we've discussed how brainstorming is useful in the generation of ideas and possibilities and how webbing is used to connect ideas and identify relationships. In activating a thinking routine, whether in the classroom or in one's own day-to-day functioning, the routine's specific purpose must be suited to the task. If we want to open up our thinking we might engage in brainstorming. If we want to choose between options we might develop a pro and con list. Thus, while still purposeful, thinking routines are more instrumental in nature than are other routines. That is, thinking routines act as a means for achieving broader goals rather than as goals themselves. We can see this if we contrast the webbing routine with a lining-up-for-lunch routine. Lining up for lunch is its own goal and performing the routine achieves that goal. In contrast, webbing is not a goal in and of itself, at least it shouldn't be thought of as such, it is a tool for connecting and organizing one's thoughts and ideas.

As we've seen, routines structure actions into a <u>series of steps</u>. For ease of use and retention, the number of steps is generally kept relatively short. This economy helps increase the routine's effectiveness and encourage its use. Many routines are even named and recalled by acronyms that refer to their steps, making them even easier to activate: KWL, for example, stands for —What do you <u>know</u>? What do you

want to know?   What did you learn—.   CSQ—claim, support, question—is another routine designed to help students consider evidence and reasons. This routine asks students to clearly identify a truth claim that they have heard or come across in some way, consider what specific evidence they have that supports the claim, and then consider what evidence or reasons they have to question the claim.

The fact that these routines have only a few steps makes them easy to teach, learn, and remember—an important quality of all routines, but of particular importance to thinking routines. Complicated routines or cumbersome processes aren't of much use in the moment. Such procedures simply tend not to get used. To be most effective, thinking supports need to be streamlined so that they can easily be called to mind right as they are needed. David Perkins (1999) has dubbed this ease-of-access quality "action poetry," indicating that there is a certain brevity and elegance that helps the routine stick in our mind and simplifies its recall when we want to put it into action. A problem-solving routine developed by my colleagues Shari Tishman demonstrates the point. The routine involves three steps: Say what, . Say why. Say other things to try. The routine is simple and straight forward, doesn't need a lot of elaboration when teaching, and has a certain catchiness to its wording that makes it easy to recall.

However, even if a thinking routine cannot be called up or used effectively all the time, it can be easily scaffolded or prompted into action by a teacher or coach. A good example of this is a routine used in the Museum of Modern Art's (MoMA) Visual Thinking Curriculum (VTC) (Tishman, MacGillvray, & Palmer, 1999).   These materials help develop students' thinking through looking at art. One strategy used to accomplish this goal is to employ a thinking routine that is also a discourse routine.   The routine involves engaging students in a discussion centered around two simple questions: What do you think is going on in this painting? What makes you say that? Students first offer an interpretation, then back up that interpretation with evidence. The questions constitute a routine in that they are a core practice of the instructional module that is used over and over. In practice, students learn the routine quickly and begin to talk about art by spontaneously answering the questions. However, if a student offers an interpretation without evidence, the teacher or a fellow student can easily scaffold the routine by simply asking the student, "What makes you say that?" As with most routines, the routine's next step is a natural outgrowth of the previous step(s) and acts as a natural prompt. There is no need to re-teach the routine or even call attention to a dropped step. A more experienced member of the group merely cues the next step.

While it seems axiomatic to say that routines are used <u>over and over again</u> in the classroom, it is worth focusing on this quality with regard to thinking routines so as to clearly distinguish them from other efforts and strategies for promoting thinking. Teachers engage in all kinds of practices to try and get students thinking. They may ask pointed questions about a particular assignment or reading. They may propose activities that require thinking, such as comparing and contrasting two objects, writing an persuasive essay, creating an application for a new idea, etc. While such tasks certain encourage thinking, they wouldn't be classified as routines because they aren't core practices that are repeated over and over again. Thus, these practices don't have a chance to become routinized for the individual or the class as a whole. When we are creating or seeking to identify thinking routines, we want to focus our attention on those practices that emerge repeatedly over time in the environment.

As we've seen, thinking routines are similar to other types of routines in that they have only a few steps, are easily learned and remembered, can be easily scaffolded, and get used repeatedly. Thinking routines have two additional characteristics that set them apart from other types or routines, however. First, thinking routines <u>are useful across a variety of contexts</u>. Second, thinking routines exist as both <u>public and private practices</u>.

Routines for passing out papers or straightening up the classroom at the end of the day are clearly one-shot, situation-specific routines. Such routines have a distinct goal and context that makes them of limited use in other situations. In contrast, much of the power of thinking routines is that they have wide applicability because of their instrumental nature. All of the thinking routines we have looked at—KWL, brainstorming, webbing, CSQ, etc.—can be useful across a variety of grade levels, subject areas, and contexts. Even some of the routines designed for specific programs, such as the VTC questions, have this quality. Although these questions—What do you think is going on in this painting? What makes you say that?— are designed for looking at art, the words "in this painting" can simple be removed and the word "here" substituted to make the routine fit easily into a science, history, reading, or math context.

Finally, thinking routines operate as public and private practices. Many of the routines we've discussed are for use only in the classroom.. Thus, they get left behind once we leave the classroom—we seldom see people raising their hands to speak at a dinner party! But, this is not true of thinking routines. Because of their broad applicability, thinking

routines often are useful outside of the classroom. In addition, because thinking routines seek to activate individual as well as group thinking, these routines can be used privately by individuals to help them help themselves achieve better thinking. For instance, when we find ourselves in a rut, we can brainstorm new ideas on our own. Before tackling a difficult problem, we can say what, say why, and say other things to try. In trying to make a decision, we can make a list of pros and cons. Although there are times when we might prefer to engage in the routine within a group, the thinking routine still can be of use to us in our private dealings.

THINKING ROUTINES IN ACTION

Having examined key characteristics of thinking routines, we want to return to the classroom to look at thinking routines in action to better understand how they get introduced, used, and enculturated into the life of a classroom. The classroom context gives us a chance to see that, while well-known thinking routines like the ones we have discussed can be useful, teachers often create their own thinking routines that often prove as powerful for them and their students than those adopted from outside sources.

In the classrooms I studied, thinking-rich routines tended to represent the major type of direct instruction in thinking that the teachers used. This was the way they attended to the development of students' ability in thinking. Therefore, it was not uncommon for new routines to be introduced throughout the year to serve specific purposes. However, a large number of the thinking routines at work in these classrooms were introduced quite early in the school year. Doing so helped to clarify the teacher's expectations for students and to send clear messages about what learning in a particular classroom was going to be like. Consequently, one way of grouping thinking routines is as the answers to certain key questions about learning that students bring with them to any new classroom: 1) How are ideas discussed and explored within this class? 2) How are ideas, thinking, and learning managed and documented here? 3) How do we find out new things and come to know in this class?

To one extent or another, all teachers provide students with answers to these questions. The answers may be fuzzy, unclear, and always changing in some circumstances, in which case students will respond with confusion and uncertainty. Or the answers may be sharp and accessible, providing students with a clear sense of how to be a productive member of the classroom. In the following examples, notice

how the routines not only provide sharp answers to the questions, but also give students useful tools, structures, and guidelines that they can use to be successful in a new classroom.

Routines for Discussing and Exploring Ideas

For classrooms to become intellectual environments in which students' develop their ability to think, they must also be places where ideas are regularly discussed and explored. Thinking is not content neutral. We need something about which to think. Something that will engage us mentally and motivationally enough to warrant the hard working of thinking. However, if students are to think well about these ideas, that is, to use their ability to reason, to connect, and to expand on ideas, they will need support in doing so. Furthermore, if this kind of intellectual activity is to take place as part of a collaborative group working together to build understanding and explore the meaning of new ideas, then processes and routines for such collaborative work must be established. How do teachers teach students to discuss and explore ideas in a way that engages them actively and brings out their best thinking? Below, we look at two such routines. The first is from Susan McCray's humanities class. The second from john Threlkeld's Algebra I course. While each of these routines is embedded into the fabric of the classroom, we will look at their introduction to see how students are first exposed to each of the routines.

The Why? Routine.

In the middle of Susan McCray's blackboard is a sentence—well, kind of a sentence:

susan sighed cause I was so nurvous I couldnt slept last knight

Off to the side of the would-be sentence, written at a slant, are the words "Daily Edit." As the combined class of seventh and eighth graders enter Susan's room, they are told to open up their composition books and get to work fixing up the sentence. This is a routine for beginning the class that Susan established the first week of school. It ensures that students know exactly what to do when they come to class, and promotes a smooth opening. As such, this is a learning routine that also serves as a management routine. While the class works on the

sentence, Susan checks in with students individually and passes back homework. After a few minutes, Susan positions herself at the blackboard, and discussion of the sentence begins. Notice that throughout the discussion, Susan is working to embed another routine, a thinking routine focused on the discussion of ideas.

"Alright," Susan begins. "Can I have everybody's attention, please. Is everybody done with the daily edit? Rachel, give us the first one."

With complete confidence, Rachel offers, "Capitalize Susan."

"Why is that?" Susan asks as she makes the correction on the blackboard.

"Because it is the beginning of someone's name."

"Very good," Susan responds as she quickly moves on, looking around the room for raised hands. "Next. Matthew."

"A comma after sighed."

"Why is that?"

Matthew responds, "Because she's talking, and she's taking a breath."

"Okay," Susan nods, and then clarifies, "She is taking a breath or pausing. You do pause after a sigh." Susan lets out an exaggerated sigh to make the point and then adds, "You also said she was talking. We're beginning a quotation. Before introducing a quotation you always need some kind of punctuation, like a comma."

Before Susan can ask for the next edit, a bilingual student still struggling with English offers a change to be made, "You need to change 'cause.'"

"Okay, what's wrong with it?" Susan asks him.

"It's kind of slang and not right," he answers.

"What should it be then?"

"Because."

"How do you want me to write it?" Susan pushes, watching to see if he will also catch that the word needs a capital letter.

" b-e-c-a-u-s-e," the young man offers.

Susan records his response on the board and then adds, "There's something that needs to come before though. What is it?"

The student quickly responds, " The quotation mark." And, without prompting he adds, "Because it's the beginning of what she is saying."

The offending lowercase "b" is next taken care of, and then questions erupt about possibly changing the sentence. "Couldn't you leave out the word because altogether? " a student asks. "Couldn't you change the I's to she so that you don't have to have quotations at all?" offers another.

As each of these issues is discussed, Susan asks, "Why? Why would that make a difference? Why do you do that? Yes, you can pause there, but why else might that need a comma?" Through her ubiquitous questioning about the reasons why one makes the editing choices one does, Susan conveys to her students that she is interested in more than answers; she is interested in the justification of those answers. At one point in the lesson, Susan explicitly addresses one student's frustration at having to provide a justification for a correct edit by telling him, "Yes, it's right. But, we are also trying to learn the reasons."

At this point in the year, Susan's active questioning teaches students a simple routine about providing answers and explanation. She conveys to them how they need to talk about this particular task as well as her expectations for them. Over the next couple of weeks, there is a subtle shift in Susan's handling of the daily edit. When she asks students for their edits, she begins to take a very slight pause, allowing students to jump in with their reasons on their own. Often students respond readily, but when Susan senses the justifications are not forthcoming, she prompts the student, "Why is that?" As the weeks progress, more and more students take on the "why?" routine themselves.

This may seem so simple and straightforward that you may wonder if is a routine at all. Let's examine it briefly through our criteria. Is it purposeful? That is, does it serve to activate and promote thinking? Yes, specifically reasoning and justification. Does it have only a few steps? Two steps: first provide an answer and then a justification. Is it easy to learn and scaffold? Absolutely. Is it used over and over again? In Susan's case, yes. It became part of the class's standard ways of operating. Can the routine operate both privately and publicly? Yes, thinking of the reasons for one's answers and justifying things to oneself can be very helpful in determining if one is correct.

Finally, is the why routine useful across a variety of contexts? More than any other single word or question, "Why?" dominates the discourse of the thoughtful classrooms I have encountered. It was present in all subject areas, from art to mathematics, and at all grade levels. From the first days, the teachers I observed used the simple question "Why?" to push students to give explanations and evidence for their opinions, answers, solutions, and ideas in mathematical computation, grammar and punctuation, historical interpretation, and so on. Thus, from the outset, these teachers establish a routine of discourse in which evidence, complete accounts, and depth is expected in students' talk. The "Why?" routine forces students to think in evidential ways, look for connections, and see that all ideas have roots. When students have difficulty responding to the question, teachers use the occasion to develop students' abilities through probing questions that help students uncover the evidence behind their thoughts.

While a fairly simple routine to establish, the why routine is missing in too many classrooms. Too often, the answer to a student's question about how ideas will be discussed and explored is that they won't be. Rather than exploring and discussing ideas in some way, information in some classrooms is predigested for students by either the teacher or the text. Such practices not only do little to develop students' understanding of ideas, but they also do nothing to promote students' abilities or inclinations to think. Let's now look at another example of how teachers use routines to help students discuss and explore ideas.

Mathematical Arguments.

It's the fourth day of school and John Threlkeld's students have run into a road block. They've been sharpening their arithmetic skills and working on lots of order of operations problems within the broader context of understanding how mathematics operates as a discipline. Along the way, John has presented his eighth graders with the following problem as part of a homework sheet:

$$x^2 \qquad (x)^{2-} \qquad x^2 \qquad {}^{-}(x)^2$$

Although this is the kind of arithmetic convention most textbooks would handle perfunctorily by providing a set of rules, in John's class it

is an opportunity to develop mathematical ideas, explore one's thinking, and learn how to work together as a community of learners seeking to understand mathematics. The ambiguity of the problem also provides a context for John to introduce the routine of mathematical arguments to his class.

After quickly agreeing to the meaning of each of the expressions listed above when x = 2, John asks the class what x^2 means when x = $^-$2. The classroom erupts in opinions as students shout both $^-$4 and 4 with equal conviction. John asks for a show of hands as to who believes what and prods those reluctant to be counted: "You have to vote. You need to have an opinion. Which camp are you in?"

The voting is split down the middle with nine students voting for 4 and eight for $^-$4. Once again, the class spontaneously erupts into discussion and conversation. At this point, the discussion is a bit chaotic, but John allows the free flowing conversation to continue for a while. Some students are arguing with their neighbors, and others are trying to make their points to the larger group. One student shouts, "Do it on the calculator!" as a sure-fire solution to the confusion. John just smiles and lets the students proceed. Shortly, the triumphant expressions of the two students working on the calculators turn to puzzlement. Each has come up with a difference answer. So much for using technology as the answer.

"Okay," John tells the class. "Here we enter a real dilemma because, not surprisingly, your calculator does something different than your calculator does. How are we going to settle this argument?" Without any formal introduction, John begins a process of calling on one student at a time to present his or her position. For John as a teacher, the challenge is not in getting students to express their viewpoints and give their reasons, however. The challenge in this mathematical debate is getting students to listen to and respond to each other's arguments.

One of the strongest students in the class raises his hand to begin the debate. "Well, it's like we were doing with order of operations. You have to do the exponent first."

"So, what camp are in? What are you arguing for?" John asks to clarify the position being taken.

"Oh, I say it is $^-$4 because you do the squaring first and then you take the opposite of it."

Another student erupts, "But that just proves the opposite side. If you take a negative number and multiply it times itself, you get a positive."

"Why are you saying take a negative times itself?" John asks.

The student elaborates on his point, "Because that's what you're doing. You're taking negative two times negative two. You're not taking the opposite of x."

Quickly, there's a dissent from another student, "But you're just substituting negative two for x and when you do that it's the same thing as negative x squared."

"Let's continue to listen to people's versions and then make some decisions," John adds. With repeated calls for patience and listening, John continues to call on students to express not their answer, but the justification for their beliefs. Throughout, John encourages students to listen to one another and build upon or contradict other's arguments. Interestingly, the girls dominate the discussion.

After a few minutes a new vote is called, and the majority of the class is now convinced the answer is ⁻4. A more timid teacher might take this as a defeat of the argumentation process, but John is unfazed and doesn't reveal any hint of frustration or surprise. Instead, he sees an opportunity to get down to fundamentals. "Where we're getting bogged down is that we're trying to remember a rule rather than think about what is going on. I need you to think about what is going on here. Let's go back to something that was brought up in the discussion. What does x^2 <u>mean</u>?" John carefully draws out the point that a variable has to be treated as an entity just as an expression in parentheses is treated, thus, $x^2 = (x)^2$. Exasperated, a girl in the second row asks, "Why didn't you just put the parentheses in the problem then?"

 John turns the question back, "Why didn't I?"

With a sigh, the girl responds, "To make us think?"

John responds and concludes the class with a final message, "Yes, that's the main reason. This isn't something just to memorize. I need you to understand it."

In this short 50-minute period the first week of school, John has stressed the importance of understanding and thinking in mathematics. But he has done more than that. He has introduced a thinking routine that the class will use throughout the year in their exploration of mathematics. But was the routine effective? After all, didn't students

get more confused by listening to each other's arguments? Remember, first and foremost, thinking routines should activate and encouraging thinking. In this episode, the students were thinking and engaging with the ideas deeply. Yes, some of their reasoning was flawed, but a thinking routine can't produce perfect reasoning, answers, or results. What such routines can do is provide a context in which the kind of thinking and results we are after as teachers are more likely to emerge. In a case such as John's, students' thinking and understanding ultimately is enhanced by becoming aware of the flaws in their reasoning.

Routines for Managing and Documenting Thinking and Learning

For the most part, the thinking routines we have discussed facilitate better thinking and performance in the moment. These routines push students into specific modes of thinking, such as evidential reasoning in the case of the why routine or logical reasoning in the mathematical argument, that serve immediate ends. In this respect, they operate similar to housekeeping, management, discourse or learning routines; they facilitate getting the job of the moment done. However, thinking routines do not have to be directed to such near-term goals. In this section, we look at how routines facilitate the long-term goals of managing and documenting thinking and learning as they unfold over time. These types or routines are much more macro in nature, assuming an overarching character in terms of students' interactions with course content. Consequently, the success of these macro-level routines as pedagogical practices depends entirely on their ongoing use and development. This is in contrast to the more focused routines we discussed in which the core practice itself could be successfully employed on a single occasion. For instance, one could engage students in brainstorming or in the process of argumentation as part of a particular lesson with relatively good results, without actually making the practice becoming a routine of the classroom; but a macro-level routine would fall apart and become much less effective if it is not routinized.

Macro-level thinking routines are useful to students because thinking is difficult work and the job of building understanding is a long and complex process. When no classroom routines for managing or dealing with this ongoing intellectual work exist, students may struggle to find the coherence and meaning behind what they are learning. More importantly, they may find it difficult to do their best thinking because of cognitive overload. That is, when the thinking demands exceed our capacity. . When our thinking is "distributed,"

that is, when we do not have to rely solely on our internal mental resources, we free ourselves up to engage in more challenging thinking.[iv] For instance, in writing this book, I have made use of distributed cognition by using notes, outlines, videotapes, computer programs, and files to help me store and organize both my data and my thoughts. By not having to keep everything in my head at once, I free up important mental space for thinking.

A standard way of looking at these distribution devices is as tools or strategies that the teacher provides initial training in and the learner subsequently masters for self-use. However, if approached and used in a way that better reflects our criteria for what makes something a thinking routine, these same devices could be considered thinking routines. Principally, that means that the practices must be relatively streamlined and easy to teach, used on an ongoing nature, and activate and help direct thinking. By returning to these criteria, we can see that while a computer data base can act as a tool for distributed cognition, it is unlikely to be used repeatedly in most classes and doesn't focus on thinking directly. In contrast, mind mapping (Buzan, 1993)—a method of note-taking that emphasizes imagery, connection making, and an individualized, non-linear organizational structure—could be considered a thinking routine in some situations. While the process of mind-mapping can be complex, this complexity can be built up over time. Thus, entry into the practice can be somewhat streamlined. In addition, mind-mapping is a tool with broad applicability across many contexts. Most importantly, the process of mind-mapping helps to direct and activate associative, aesthetic, and creative thinking in the service of advancing memory and understanding. How do teachers introduce and get students to use such macro-level routines? Below, we look at two such routines for documenting and managing thinking that teachers Chris Elnicki and Heather Woodcock introduced.

Documenting Thinking with a Journal Routine.

There is nothing distinctive about the spiral-bound notebooks Chris Elnicki asks his seventh-grade social studies class to bring to class. For the most part, they are standard issue, 80-page, notebooks of college-ruled paper. However, the process of personalizing the notebooks begins right away. On the overhead projector, Chris displays a sample cover containing four key pieces of information:

[Title]: A Citizen's Journal
By [Your Name]
1998-1999

How Organized: [?]

Chris quickly moves students through each of these elements, first explaining the role of the title: "You can name your journal anything you want. You could call it 'Things Elnicki Made Me Do' or 'Bob.' It really doesn't matter because it is yours. The second part of the title is a subtitle, 'A Citizen's Journal.' You are a citizen of this class, and this is your history of involvement with this class. It will document your learning and you will use it to help you make sense of what we are studying. If you want, you can just let the subtitle be your title."

Soon, questions come up about what is meant by organization of the journal. Chris elaborates by way of example: "You have to make a choice about how you are going to organizing things. I've only seen two ways that students have done this. One is to put things in order. I'll show you some examples of that, but basically you organize things by date. Chronological order. Another way to organize it would be by section. You could have a section for 'First Things,' and then a section for assignments and notes or homework. Most people, about 80%, do sections. I don't see any difference in the good and the better journals according to which way they are done. I don't have a preference. Do it whichever way you feel most comfortable with."

With this managerial task out of the way, Chris moves on to the task of helping students develop a sense of how they will use the journals to document their learning and deepen their understanding. He does this by way of showing examples of journal entries made by former students. Putting a copy of a student's response on the overhead for the entire class to see, Chris tells the class, "When you write your responses, you need to make sure that you communicate fully. That means when you pick it up or I pick it up five years from now, you know what it is saying. So, let's test and see if this person is doing that."

Chris then moves into the example, reading to the class from the journal entry, "9/25. If I could go back in time and live with any Native American group, I would select the Anasazis because they have a lot [sic] of land and their homes are well built." Turning to the class, Chris asks, "Okay, what do you think the question was?"

A student volunteers, "If you could go back in time and live with a Native American Group, who would you choose?"

"Right. That was the question," Chris responds. "This person communicated fully. We know what the question is. They didn't have to write the question, but we still know what it was."

Next, Chris asks students to assess the response itself. Using his school district's grading scheme, Chris asks the students how they would characterize the response, "Is it proficient, basic, or advanced?"

"Basic," a student in the front row responds.

"Does that mean you think it is below grade level?" Chris pushes.

"No," the student backs down. "Maybe proficient?"

"How many of you think it is proficient?" Chris asks the class. Most of the hands go up, and Chris pushes forward to the real intent of his questioning, "What would it take to make this an advance response? What could be added?"

"More detail," a student answers.

"More detail about their homes. What they were like," another student elaborates.

"Maybe who you wouldn't want to live with and why?" offers another.

"Okay, you kind of reversed it then and have taken a different angle. That shows some advanced thinking." Chris then adds, "Maybe if you compare it to something else. Maybe if you add some new information that we didn't talk about in class. How about if this person talks about what other people said? 'I heard someone in the class say this during the discussion' or 'I heard Mr. Elnicki added that…' That would probably be more advanced because they are including some more information."

In this first example of a journal entry based on a 'First Things' prompt, Chris emphasizes the two key elements of the journal writing routine that he will reinforce throughout the year. First, there is the need to communicate fully so that one's notes can be understood, both to oneself and to others. Second, it is important to go beyond one's first thoughts and initial response to elaborate and add information. Chris specifically mentions the process of adding to one's response based on the class discussion. In this way, the journal is not just a record of one's response or a compendium of classroom assignments; it is a vehicle for building connections and developing understanding.

Using the journal to build connections can be seen in a later class when Chris asks students to construct a web of the American Revolution. Before the class begins their unit, Chris shows the basic structure of a web—with nodes for such things as Battles, British Views, Causes, Impact, People and Results—and asks students to copy it into their journals and begin the process of elaborating upon it. As the class discusses their initial ideas, Chris encourages students to add to their webs and make note of these new additions, "When you adding something I say or something anyone else adds, make a star or underline it. We want to keep it clear what were the first things you had on your own and then what you added." Thus, Chris emphasizes that the journal is a process for developing and extending one's learning.

The importance of these two steps also is reinforced when Chris assesses his students' journals. While he frequently makes note of missing items and admonishes students about organization and structure, his most frequent comments to students are, "Communicate completely! Be sure to explain what you are doing" and "Go beyond your first thoughts and strive to do some deep thinking." It is in these two elements that the journal most acts as a thinking routine. By asking students to clarify questions and go beyond initial thoughts, Chris promotes connections and the continual elaboration of ideas.

Guiding Questions as a Routine for Managing Thinking.

In the last chapter, we saw how Heather Woodcock used a set of guiding throughline questions to convey a sense of the power of ideas and to set an agenda of understanding for her seventh-grade humanities class. (Refer to Chapter 4, page XX for a list of the seven questions). At the outset, Heather's posting of these questions worked as an advance organizer of students' thinking by highlighting the most important themes and questions of the course and orienting students' expectations. However, it is Heather's ongoing use of the questions, rather than the questions themselves, that actual establish what we now understand as a thinking routine.

By activating a process by which students regularly engage the throughline questions, Heather establishes a thinking routine centering on connection making. Heather's initial introduction of the throughlines to her students first hints at the connection-making emphasis: "What these questions are are questions we are going to return to throughout the year. All of these questions can be connected in many, many ways to what we are studying in here and to our day-to-

day lives. They can be connected to history, to literature, science and math in a lot of different ways." Students are then asked to begin the process of connection making in a very general way by selecting a throughline question to think and write about in an early paper. However, because the class had not yet begun its studies, the actual connection-making routine isn't activated in this initial introduction. The routine itself emerges later in a formal writing assignment related to the class's first unit of study. In this unit, students are reading <u>A Wizard of Earthsea</u>, by Ursala Le Guin, and studying old world explorers. As a part of this study, Heather gives students the following writing assignment:

Throughline Connections

Choose a throughline that you think connects to either our study of <u>The Wizard of Earthsea</u> or our study of Explorers.

- In you first paragraph, explain the throughline you have chosen and discuss its implications and meanings.

- In your second paragraph, connect that throughline to <u>The Wizard of Earthsea</u> or the Explorers by pointing out how the throughline can inform, clarify, or expand your thinking about what you studied.

These two questions—which might be generalized to take the form of: What does the throughline mean to you now? How does the throughline connect to and inform what you are studying?—essentially make up the thinking routine. It is a routine because the questions are asked over and over and become a part of the life of the classroom. At times, Heather stops class and holds an impromptu discussion using the questions, or she asks the questions more formally as part of a writing assignment.   The questions effectively guide students' individual thinking as well. Asking oneself these questions in the midst of study facilitates the process of connection-making and deepening understanding. In both the public and private realms, this connection-making routine, when coupled with the throughline questions, helps

students manage and direct their thinking in the course by constantly pulling students toward the bigger picture and ideas.

Routines for Finding Out New Things and Coming to Know

I'm observing the first day of school as it unfolds in a fairly traditional, suburban, high school mathematics classroom. The room is neat and orderly, and the teacher, a veteran, is well prepared. She has organized this first day to emphasize the housekeeping and management routines that will help her maintain the decorum she feels is important to learning. Unbeknownst to her, she is also instructing her students in a routine about how the class will come to know and find things out in her class. She does this through a brief lesson on perfect numbers, which provides the only mathematical content of this first day. Seeking to engage students in an open-ended and non-threatening way, the teacher asks her students to devise and share their own definitions of what a perfect number is. A few students gamely participate, while many others hold back. Perhaps they are confused by the lack of context for the question. Perhaps they sense that guessing at the right answer is the best they will be able to do. The few students who actually do take up the challenge do so with a sense of humor:

"A perfect number is any number with a dollar sign in front of it."

"A perfect number is infinity because it goes on forever."

"14 is a perfect number because that's my birthday."

Pleased with these humorous, if not mathematical, responses, this experienced and well-respected teacher smiles at the class and gamely asks, "Would you like to know how mathematicians define a perfect number?"

Off to the side, a student, who has watched the exchange quite passively up until now, responds in an resigned,, though not impolite, manner, " It doesn't matter whether we want to know or not, you're going to tell us anyway."

In his comment, this student reveals that he has recognized the futility of the classroom exchange and seen through its hidden subtext. There may be opportunities to participate in this class, if you are willing to be a good sport about it and just play the game, but in the end the teacher will deliver the information she expects you to know. To play

the game of school, you will try and hold on to that information just long enough to return it to its rightful owner on the day of the test. At that time, the veracity of one's informational stewardship will be judged. Through his comment, this student also acknowledges what he feels is the de facto routine by which students find out new things in this and most other classrooms: They are told, either by the teacher or the textbook.

Of course, a routine such as being told affords students little opportunity to develop their skills in thinking. Furthermore, when this routine dominates the life of a classroom, students' inclination to think is not only neglected, but is also suppressed. When all one needs to do is wait on the teacher to deliver the goods, thinking seems to have little payoff. Fortunately, there are other responses to the question of how students come to know and find out new things. Below we look at two routines used by Heather Woodcock and Chris Elnicki to help their students engage with reading and develop an understanding of the past.

Writing: A Routine for Coming to Know. A few pages of lined paper, folded over and stapled, serves as an impromptu journal for Heather Woodcock's students. Although not fancy in its construction, the simple journal becomes the core of a routine for students as they read <u>The Wizard of Earthsea</u> together. Heather explains, "This is a journal just for <u>The Wizard of Earthsea</u>. You're not going to put anything other than Wizard of Earthsea thoughts in it. The way this is going to work is this: Starting today you are going to do a little bit of writing in class. We're going to start and end class with time for you all to think and write, because I find that it helps me before a discussion to write a little bit to get my thoughts in order."

This simple routine, giving time for thoughts before and after reading, needs little more instruction than that. When a few students question what they should write about before they read, Heather suggests, "Write any questions you have about the book so far. What are you wondering about?" This prewriting activates students' thinking and identifies confusions. It also brings the group together as a learning community seeking to develop an understanding of the book. This quality emerges when Heather asks students to share any questions or confusions they have about the book thus far.

One students offers, "Why do some people [in the book] have magic and others don't?"

"Great question, Johnny," Heather responds. She begins to answer his question and then pulls herself back, "I want someone else to answer. It doesn't matter what I think. What do you all think?"

Several students offer their thoughts. Some suggest that the magic has to be developed and comes from a desire to cultivate it. Others feel that the magic is something some of the characters are born with. After several such theories are floated, Heather tells the class, " What I'd like for you to think about as you are reading is where does that magic come from?" Thus, the brief prewriting period helps shape students' reading of the text by focusing their attention on certain questions or puzzles.

After students have read, the follow-up writing helps students reconnect with their initial thinking and record their developing understanding. In addition, the writing prepares students for speaking and sharing their ideas in the class discussion. By giving students time to organize their thoughts, Heather ensures that all students are more ready to participate in a discussion.   In this way, the writing is a routine to facilitate students' metacognition. As students become more comfortable with the routine of using writing to think about their thinking, the routine can move from the external realm of the notebook to the internal world of the mind.

The routine itself, as well as Heather's guiding of the discussions it prompts, sends students a very different message about what it means to learn and find things out than the message of traditional classrooms. Rather than being spoon fed information to memorize, students learn that understanding is an iterative process of constantly examining what one knows and doesn't know, posing working hypotheses that one can investigate, and discussing ideas as part of a group. Students also learn the power of self-questioning for focusing one's attention and efforts. Related to this questioning, students learn, through the class discussions, that in this class questions aren't so much answered as they are investigated. This gives the work of the classroom an active sense of energy that can carry it forward.

A Routine for Making Interpretations. As part of their exploration into the question of "Why are you here [in school]?" Chris Elnicki passes out old photographs, taken by Lewis Hine and other photojournalists, of child labor conditions in the early 1900's. Each pair of students receives a photo and is asked to engage in the process of historical interpretation. This exercise offers students their first

opportunity to practice a routine to which Chris has just introduced them to on this, the first day of school.

Having had students make interpretations about himself and course based on the evidence they can see in the classroom, Chris next introduced students to a more formalized process of interpretation using a photograph pinned to the back wall of the classroom. In the photograph, a person on the back of a horse plummets toward a small tank of water while a sea of upturned faces stands spellbound. Directing students to the picture, Chris explains, "These five steps help us to find things in photographs that we may sometimes overlook and maybe to help us learn more things about it."

Chris then walks students through the steps, carefully explain each one in the context of the photograph the class is observing: "The first step is our first reaction. You can't stop this. It immediately comes up in your brain. Your brain does this automatically when you see it. It could be, 'Ugh, black and white photograph, I don't like it.' Or it could be 'I didn't know horses could fly.' But, it is usually connected to a feeling."

"Our next step would be to collect data," Chris continues. 'We are going to count some stuff. We're going to look to see what kind of detail there is." Moving closer to the photograph, Chris begins the process of noticing details out loud while the class watches, "Here's men with suits and men without suits. Here's a cowboy and a number of people wearing hats. I can count the number of horses in the air. I can look at her clothing and see what I can discover. Well, she has a bow in her hair. She has a belt around her waist. She's wearing some interesting shoes. I can count about eight pieces of lace." Chris adds, " I can count support beams. I can maybe make some guesses about the distance here. Oh, hey, what's this? There's another horse there. I never noticed that before."

Moving toward the front of the room and away from the picture, Chris tells the class, "The data will generate questions for me and I can make some overall generalizations from that data. What can we say about the picture?"

A student interjects, "Like it's a picture of people watching a woman and a horse jump."

"Right," Chris continues. "That generalization is very provable from that evidence." He adds, "Inference is the next step. You've been doing that with me. You made inferences about who I am and what this class is like from my symbols and the evidence around the room. We could

make inferences about the picture. Why was it taken? Are the people happy? Sad? Excited? What am I going to find outside of this stadium?"

Again, students begin to offer ideas: "A parking lot." "Cars." "A field."

Wrapping up the process, Chris introduces the last stage, "The final stage is conclusions. What did you learn from this?"

It's been a quick introduction and a somewhat truncated example in practice, but Chris is anxious to get students engaged in the process themselves, knowing that learning the routine requires doing the routine and not watching it be done. Chris also knows that this process will be repeated throughout the year–sometimes in a formal manner going through each step and writing responses, sometimes informally moving quickly through the first steps to focus more specifically on interpretation. In teaching and practicing this routine early on, Chris conveys to students that his class is not just about getting answers, it is about finding out answers. He wants his students to know that the history they read is based on the process of interpretation of evidence and that it is the evidence that must be kept front and center, not the interpretation.

THE IMPORTANCE OF THINKING ROUTINES

Routines dominate the life of classrooms. From passing out papers, to checking homework, to dismissal at the end of the day, each and every classroom has its own unique way of doing things. While these housekeeping, management, and discourse routines contribute a great deal to the overall feel and decorum of a classroom, it is the thinking routines, or their absence, that give a classroom its intellectual life. Through these thinking routines, students are enculturated into thinking, developing both their ability and their inclination to think. In every thoughtful classroom I have visited, thinking routines, rather than direct instruction or the use of any thinking-skills program, were the principal means by which teachers developed students' skill and ability in thinking.

Thinking routines provide us with a new way of looking at critical thinking instruction. When administrators, parents, or teachers are concerned about getting students to think, it is not unusual for them to seek out programs or curricula on critical and creative thinking. These lessons may be good. They may even be effective at developing students' skill. What these materials often fail to do, however, is to

enculturate a disposition to think. When we look at the process of enculturation closely, this fact is not surprising. Enculturation depends on immersion into a way of doing things over an extended period. This immersion process is accompanied by a fair amount of ongoing mediation, support, and nurturing from more experienced members of the culture. While some direct instruction may occur as one learns how to operate in a new culture, it is only through ongoing participation in and practice of the culture's routines that one gradually comes to feel a part of that new culture. The problem with most prepackaged, thinking-skills programs is that they sit outside the culture of the classroom, never really becoming a part of it.

In contrast, thinking routines form a unique bridge in the process of enculturating students. On the one hand, because of their ongoing use and broad applicability, thinking routines embody a class's way of doing things when it comes to thinking and learning. They are a part of the cultural fabric that communicates the values, intent, and feel of a classroom. In this way. thinking routines play an important role in developing a culture thinking. You may have noticed that many of the routines shared were introduced early in the school year, often during the first week. This is no accident. You also may have noticed that some of the examples of first-days practices shared in the last chapter could be looked at from the perspective of thinking routines. It is precisely this ubiquitous and embedded nature of thinking routines that makes them such powerful cultural forces. On the other hand, thinking routines act as the means of enculturation themselves. Because they are so easily taught and scaffolded, thinking routines become the way teachers build students' capacity and commitment toward thinking. Thus, thinking routines are both the tools of instruction into the culture and part of the culture itself.

---

[i] The research of Leinhardt et al (1985, 1987) focuses on identifying differences in routines established by experienced and novice teachers. What I refer to as housekeeping routines are dubbed management routines by Leinhardt et al. What she and her colleagues call support routines, I refer to as management routines; and what she names exchange routines, I call discourse routines. I have chosen my terms solely for the purpose of clarity and to help make a clearer distinction between the purposes of the various types of routines. Of course, it is the constructs rather than the labels that matter most. Readers might be aware of other terms used to

describe routines as Leinhardt et al are not the only researchers to explore this topic. Routines have also been explored by researchers working within the process-product paradigm discussed earlier. This line of research is concerned with identifying links between the early establishment of routines and effective classroom management.

[ii] Examples of conversation protocols can be found in (Ritchhart & Blythe, 2001).

[iii] The criteria for thinking routines grew out discussions with my colleague Shari Tishman . I wish to thank her for deepening my understanding of the special qualities of thinking routines and what they offer students.

[iv] Gavriel Salomon, Roy Pea, and David Perkins have written about distributed intelligence. See; for example, (Salomon, 1993) (Perkins, 1992).