Standard 4: Students Engage in Metacognitive Activity to Increase Understanding of and Responsibility for Their Own Learning

- **Indicator 1**: Teacher and all students understand what students are learning, why they are learning it, and how they will know if they have learned it
- **Indicator 2:** Teacher structures opportunities for self-monitored learning for all students
- **Indicator 3**: Teacher supports all students to take actions based on the students' own self-monitoring processes

Metacognition, thinking about our own thinking, is a foundational cognitive process that is essential for creating independent learners. Metacognition impacts learning in numerous ways. Research has shown that students who monitor their own thinking and take action based on that knowledge are more successful learners than their peers. They understand the "how" of a task, allowing them to process more deeply, think more critically, and create more meaningful and lasting connections. Metacognition also impacts internal motivation (see *Literacy Connects XLI – XLIII* for more on internal motivation) and creates a sense of self-efficacy in the learner. Students who identify and work towards personally challenging and valued learning goals, while understanding their own strengths and weaknesses, spend more time working on a given task and exert more effort when confronted with a complex task.   This type of self-regulated learning also includes the ability to respond to feedback and more successfully cope with new situations.

Metacognition has two components: **Metacognitive knowledge** and **metacognitive regulation**. Metacognitive knowledge is understanding what factors impact performance, including knowledge about oneself as a learner. For example, a student uses metacognitive knowledge when she/he annotates text during reading as a way to stay active and engaged in the reading process. Metacognitive regulation is the actual monitoring of one's own thinking. This promotes awareness of one's own strength and weaknesses and the ability to take responsive action based on this understanding. Setting, revisiting and revising learning goals is requires metacognitive regulation

The following activities will help build students' metacognitive knowledge:

THINK-ALOUDS—Modeling the reading process to teach active reading
When you think aloud—verbalize YOUR thinking process—during a mini-lesson, an oral reading, or problem solving exercise, you are offering students strategies that can enhance their comprehension and self-monitoring abilities. During a reading think-aloud, you are modeling for your class how a reader approaches and understands text. To think aloud, readers pause periodically, think about and verbalize what they remember, understand, and visualize, while integrating the name of the reading strategies they are using. In this way, students actually experience what occurs behind the invisible veil of active reading. Repeated use of this strategy will help students internalize and integrate effective comprehension strategies into their own reading.

Procedure:
1. Explain that thinking aloud means that you say what is going on in your mind as you read and try to understand what you are reading.

2. Before you begin reading, list the strategies you will use while you read:

   - Predicting—What will the reading be about? What do I know about this topic? Why am I reading this piece? What do I need to learn from this passage? What will I do with this information once I've finished? How should I read this (closely, skimming…)?

   - Pre-viewing text—scan headings, subheadings, words in bold/italics, graphs, pictures, etc. Make predictions based on the preview.

   - Picturing—What do I see when I visualize what the author is saying?

   - Making connections—What do I know about this? How does this topic relate to me/to my experiences? This is like…this reminds me of…I remember when…

   - Fixing problems—I need to reread this. I don't know this word, let me see if can use context clues? If I look at the root/prefix/suffix, can I figure this word out? I don't understand this part, maybe I should read on and see if that helps.

   - Summarizing—I understand now, this means…; putting this in my own words…; let me repeat that sentence….

3. Present your demonstration while the students read along with you. For the first few sessions, I proceed slowly, dramatizing each strategy for emphasis. As the students become more accustomed to this activity, you can have them keep track of the strategies you use; this will allow you move more quickly through the text.

4. Spend time discussing the activity. Explain the strategies you used, why you used them, and how they helped you comprehend the passage. Allow time for the students to ask questions and to share their own reading problems and strategies.

5. After students have several opportunities to listen to you model think-alouds and to identify the strategies you use, have them practice think-alouds with a partner. One student should read a paragraph, while the other student plays the part of "the brain," stopping the reader to think aloud. They summarize and discuss the paragraph and then switch roles.

6. Reserve some time for you and your students to continue practicing thinking aloud with any new strategies you introduce or when teaching problem solving.

Scaffolded Reading Experience--Building a purpose for reading

Reminding students of the importance of the reading process and modeling reading using the "Think Aloud" will allow students to see and hear how a strong reader makes sense of difficult text (See *Literacy Connects #1* for The Think Aloud). The Scaffolded Reading Experience (SRE) is a strategy that uses all parts of the reading process, works well as a "Think Aloud" and is flexible enough to be used in all subject areas, with all levels of readers (Graves & Graves, 1994).

Scaffolding refers to the degree of support a teacher must provide to enable students to read more difficult texts. Initially, struggling readers will require a high level of support and more able students less. Before using SRE, consider the needs of your students, the difficulty of the text and the purpose for the assigned reading. This will determine how much scaffolding you will need to provide for your class.

1. **Pre-reading Stage:** In order to build background knowledge before students begin reading, either show a picture that relates to the theme of the reading or have students browse the chapter of their text noting illustrations, graphs and/or headings. Have students work in pairs to answer these questions: What does this picture(s) remind you of? Judging from the illustrations and captions, what do you think this chapter/reading is about? or What do you know about this topic? These questions will trigger students' prior knowledge and help build interest. Next, help students "fill in the blanks" by giving a brief overview of what will be presented in the text. Use only general, non-specific information that requires further investigation by the students to build connections between their prior knowledge and the information they will be reading. Model this step by showing students how you preview and predict content before reading. At this point, you can also identify and explain difficult vocabulary words in the text to support comprehension.

2. **During Reading Stage:** Develop broad, open-ended study guide questions to support student reading of the text. Refer back to your initial planning stage and write questions that match the learning/reading needs and interests of your students and the purpose you set for the reading. Ask yourself questions like: What do my students need to know about this chapter? What do they already know? How can I help them connect prior knowledge to new learning? How can I pique their interest in this material? Students can complete this in pairs or individually (see *Literacy Connect #13* for peer reading ideas). As the year progresses, you can pose fewer questions as students become more proficient readers.

3. **Post Reading Stage:** Once students have finished the reading, help them process and connect to what they have learned through critical response to the text. They can write summaries (See *Literacy Connects #5* for summarizing) or choose from a selection of assignments. Following are a few creative ways to motivate student response: Creating posters that answer questions from the study guide, using a list of stems from Bloom's Taxonomy to create questions for other classmates

to answer, writing from the perspective of someone or something in the text (see *Literacy Connects #7* for R.A.F.T.) or creating a Podcast or PowerPoint.

Reflective Learning

Countless studies have shown that metacognition (thinking about your own thinking) and reflection increase learning in all areas. When we make a mistake, two executive systems in the brain's frontal region react, helping us to correct the mistake. When we see, correct and reflect upon our own errors, we learn (Sousa, 2001; Stuphom, et al. 2000; McDonald, et al. 2000). Reflection should occur at all points in the learning process. Making predictions and creating questions at the beginning of a chapter, lesson or unit, provide the scaffold for self-assessment and reflection during and after learning. In our haste to cover curriculum, we often focus only on the end result. Shifting focus so students reflect on the how and why of learning will enable them to transfer skills learned in one situation to other areas (remember the old adage about teaching a man to fish?). Following are strategies designed to promote metacognition before, during and after learning.

Question Swap: A question swap can help focus the learner and create reading with a purpose, as well as provide the basis for reflection after the reading or lesson (see *Literacy Connect Issues I, IV, XVII, XVIII* and *XXI* for more on generating questions):

1. Students create and write 2 questions about the given topic on a half sheet of paper.
2. They need to know the answer to their own questions.
3. For the first question, they find a partner and swap questions.
4. They answer their partner's first question and include their name.
5. They then repeat Steps 3 and 4 with a second partner for the second question.
6. At the end of the unit or lesson, students reflect upon the questions and answers. What did they get right? Wrong? Why? Have them explain their thinking.

Journals, Learning Logs or Exit Summaries: These forms of informal writing are excellent for promoting metacognition. Following are sample journal starters (see *Literacy Connects XI* and *XI*I for more on reflective writing):

- I understand …. but I don't understand …. because ….
- When I don't understand how to solve a problem, I ….
- To solve this problem, I had to….
- If I did this again, I would….
- What part did you struggle with?
- What changes did you make and why?
- How did your thinking change?
- Today my thinking is like … because ….
- What did you do well?

- With what do you need help?
- What was easiest for you? Hardest?
- Which strategies work best for you when reading…?

Portfolios help students, teachers and parents monitor learning. Have students return to their portfolios periodically and reflect on the work represented there. Ask them to choose examples of their best work, work they are most proud of, or work that shows the most growth and have them justify their choices.

Teacher Reflection: End of the year surveys, as well as reflections and portfolios, provide rich data to assess learning, monitor growth, and reveal student attitudes and motivation towards that learning. Instructional changes based on these factors are often more relevant and useful than other more formal types of data.

Process and Discovery Activities for Writing

1. Turn on a tape recorder while you write, and talk out loud about what you're doing. Don't worry about talking in complete sentences. Just talk to yourself, the way you probably do talk without realizing it. "Let's see…mmm…I wonder if…perhaps I'd better go back…no, I guess I'll keep going on this draft…I've got to start this stronger, maybe use a better verb…does that make sense? I need to stop worrying about this part and just get something down…." After you've finished, listen to the tape as you read your draft, then make notes on what you're doing so that you can discover how you write. Share with a classmate or two.

2. Find a painter, composer, scientist, engineer, play director, journalist, or potter—some kind of creative person who will let you observe them while they work, so that you can see another process and discover its relationship to the writing process. Write a short essay comparing and contrasting their process with the writing process.

3. Think back on a skill that you know, and describe it in process terms. Then see if you can translate that skill—taking photographs, cooking, making a dress, repairing a motorcycle—into writing terms to see if it makes sense to take the tricks of one skill and use them in another.

4. Start a process log or daybook, picking out a notebook that feels comfortable to you and is the right size so that you can have it with you almost all the time. Doodle in it, write in it, record dialogue and favorite quotes, paste things in it, put down observations and thoughts, ideas and drafts for titles, leads, endings, middles. Make outlines and diagrams. Talk to yourself, think to yourself, find out what you are seeing, hearing, feeling, thinking and what it means.

5. Draw a picture of your writing process to see what it reveals of how you work when the writing goes well. Draw another picture of your writing when you are stuck and can't produce. Get another

classmate to do the same and compare. List the stages in the writing process that are necessary for you.

Interactive Lectures

A lecture is an activity in which the teacher presents information and knowledge orally through a series of organized and structured explanations. Lectures can be both formal and informal. Formal lectures allow for very limited student interaction. Interactive lectures increase student retention of information by 20 percent over formal lectures.

In contrast to other instructional/cognitive strategies, lectures generally involve the least amount of student involvement. However, there are some ways to vary the lecture approach to make the process more beneficial for the students.

1. **Feedback Lecture:** Provide students with a reading and outline of the lecture notes in advance. Lecture for 10 minutes, and then divide students into study groups (2 to 4 in a group) for 20 minutes. During this time, students should be discussing a high level question related to the material. Reconvene for another 10-minute lecture and address the study questions in your comments.

2. **Guided Lecture:** Provide students with a list of objectives for the lecture. Have them put down their pencils and listen carefully to the lecture for 20 minutes. At the end of the 20- minute lecture, give students 5 minutes to write all the information they can recall individually. Next, involve them in small discussion groups (pairs also work well) to reconstruct the lecture using their notes. Help students fill in the missing information as a class.

3. **Responsive Lecture:** Devote one class period a week to answering open-ended, high level, student generated questions on any aspect of your topic or unit of study. All topics have to be presented as questions; students must specify why they think their question submission is important; the class orders the questions in terms of class interest; and, the lecturer answers as many of the questions as time allows.

4. **Demonstration Lecture:** During the lecture, take time to stop and demonstrate an application to illustrate selected principles of your lecture content. Pose a series of "What would happen if…." "What do you think caused….." type of questions.

5. **Pair/Share Lecture:** Deliver a 20- minute lecture and have students take notes. Every 5 to 10 minutes, pause during the lecture, and give students no more than 2 minutes to share their notes with a partner and fill in any missing information.

6. **Think/Write/Discuss Lecture:** Prepare a set of 3 related high-level questions to ask students throughout the lecture.

a. Give the first question (a motivational question that helps set the stage) before the lecture and have students write a 2-minute response.

b. During the middle of the lecture, pose another question to clarify the information being given. Ask students to write a short response; share some of the questions aloud.

c. At the end of the lecture, ask a reflective question that encourages connections and applications.

Journals

Journals, or learning logs, are among the most worthwhile types of reflective writing. When used purposefully, with instructional objectives in mind, journals allow students to think on paper, thus promoting the development of ideas and content knowledge. Journal writing enhances creativity and organization skills, while developing critical thinking skills through the interpretation and synthesis of the ideas presented. Journal entries are informal and can be used flexibly in all subjects. They can be collected and read or simply acknowledged as completed; they can focus solely on thought process or can be revised and developed into more formal writing assignments. Journal writing is easy to implement; students need only a notebook and 5-10 minutes, several days a week to write.

Following is a list of possible ways to use journals in your classroom:

To initiate learning—to introduce a topic, build background, access prior knowledge
- ✓ Thematic or relevant quote/pivotal quote from text
- ✓ Key concept: "What do you know about…?"
- ✓ Picture: "What is this?" "Describe what you see?"
- ✓ Music

To record thought
- ✓ Notes: "What questions do you have about…?"
- ✓ Reflections: "What do you think about…?" "I wonder…." "What if…?"
- ✓ Summaries: "I learned…"; current events, reading, class activities…
- ✓ Observations/inferences: "What do you see? What does it mean?"

Explore the thought process
- ✓ "How do you solve…?"
- ✓ "Describe the steps…"
- ✓ Where did your thinking go wrong?
- ✓ What will you do differently next time?

Reflect
- ✓ Self-discovery: "How does this relate to you?"
- ✓ Meta-cognition
- ✓ How do you feel about….
- ✓ What would you do if….

Play with thought & language—create, fantasize, imagine
- ✓ Stories
- ✓ Poetry
- ✓ Quotes
- ✓ Art
- ✓ Music

Pre-write & pre-read
- ✓ Explore ideas—who, what, when, where, why, and how?
- ✓ What do you know?
- ✓ What will this be about?
- ✓ Predict outcomes

Writing to Learn for Processing and Reflection

Exit statements or "Ticket out the Door"
This is an ideal summarizer and closure activity for times when there are only a few minutes at the end of the class. Students write something brief related to that day's lesson. Ticket Out the Door allows students to reflect on, connect to, and/or summarize what they have learned; it allows the teacher to assess to what extend students have achieved the lesson's outcome. This activity works well for vocabulary review, as well.

Examples:
- Name one (two, three) important thing(s) you learned in class today.
- Write one question about today's content—something that left you puzzled.
- Read this problem and tell me what you will do first.
- How can you use what you learned today in _____?
- Give me at least one reason why _____.
- How does what you learned today connect to _____?
- Write your own word using the prefix/suffix/root of the week.
- What made learning easy or hard for you today?
- How will you/I know when you have mastered this concept?
- What predictions do you have for tonight's/tomorrow's reading?

Question: Think-Write-Share: The teacher poses a question, the students think for about 1 minute about the question, the student writes a 1 sentence response to the question, and the student shares the response with a classmate. The teacher has three or four students share their response.

Carousel Brainstorming: In small groups students brainstorm ideas on a given topic. They write their thoughts on posted chart paper for a given amount of time. Once their time is up, they rotate clockwise and read what another group has written and add their thoughts. This continues until all the topics have been explored or students have had a chance to read and respond to all the responses from all the groups.

Quick-Draws: Select a "big idea" or major concept within your lesson. Ask students to reflect on the meaning of the concept and crate a visual image that represent that concept (about 3 minutes). Have student share and explain their image with a partner, in a small group (Numbered Heads), or in a Chalkboard Splash.

Chalkboard Splash: This is a variation of the Pair-Share, Quick-Write or Quick-Draw. Once students have recorded their individual thoughts, have them write their responses (or group responses) randomly on the whiteboard or chart/butcher paper. After recording their responses, ask students to create a 3-column chart with the headings: similarities, differences, and surprises. Students read and analyze the other responses and record what they noticed under the columns. Students then get into small groups and share what they noticed. Have groups share with the whole class.

Similes: Create similes using some of the topics you are studying. Ask students to formulate an explanation for how the simile might be true. Ask students to share with their partners, in small groups, or in a Chalkboard Splash their responses. After similes have been modeled a few times, ask students to create their own similes based on the topics they are learning. Always ask them to explain their thinking.

Ranking: Select items, concepts, steps, events, descriptive paragraphs, or other relevant content information that can be analyzed and ranked within you unit or lesson. Ask students to rank them according to specified criteria. Ask them to provide justification for the way they chose to rank the concepts.

Ensuring Higher-Order Thinking

- Always ask students to explain why and justify or defend their thinking
- Use open questions: In what ways…How might things be different if….Why is this important….How does this relate to our lives? So what? Why is this important?
- Use a word bank to ensure that academic vocabulary is used.

The following activities will help promote metacognitive regulation in students:

Reflective Research Log
To facilitate the research process, students can keep a research log. Divide a loose-leaf notebook into six sections. The sections should contain the following information:

- **A working bibliography.** Each potential source is entered in complete bibliographic form and briefly annotated.
- **Notes and quotes.** This section takes the place of the old note cards and is keyed to section one. This is where you take notes and record important quotes from your sources.
- **Working outline.** Because it is virtually impossible to outline anything until you know what you want to say, this is a tentative outline that may change weekly as new ideas and materials surface.

- **Flashes of brilliance**. This is an ideas section where you record your thoughts, reflections, and comments about your topic.
- **Weekly summary**. Each week, you should log time spent on reading, writing, looking, and thinking. Be ready to discuss your summary with me at any time.
- **The rough draft.** Ideally a rough draft grows over time. In this section, write parts of the rough draft whenever you are ready. Sometimes the ending comes first; sometimes you are ready to write one section before others. I encourage you to read and write DURING the research phase and to record your thoughts.

Post Exam Reflection

This activity is designed to give you a chance to reflect on your exam performance and, more importantly, on the effectiveness of your exam preparation. Please be candid in your responses, so they will be valuable to you and to me. Your responses are being collected to improve teaching and learning in this course. They will have no impact on your grade, but you will receive credit for thoughtful reflection.

1. After studying for this exam, how many points (out of 100) did you expect to earn?
2. After completing the exam, how many points (out of 100) did you think you had earned?
3. How many points did you receive?
4. Approximately, how many hours did you spend studying for this exam?
5. Did you study enough?
6. Could you have studied "smarter"?

What percentage of your test-preparation time was spent in each of these activities (total should be 100%).

1. Reading textbook sections for the first time
2. Re-reading textbook sections
3. Answering end-of-section questions
4. Reviewing knowledge survey questions
5. Reviewing your own notes
6. Reviewing handouts
7. Discussing course materials and questions with classmates
8. Study the relationships among concepts and ideas

Carefully look over your exam and estimate the percentage of points you lost to each of the following (total should be 100%).

1. From careless mistakes
2. From not being familiar with terms
3. From not knowing facts

4. From not understanding concepts
5. From not being able to apply concepts in new contexts
6. From not seeing connections between concepts or facts
7. From other reasons (please specify):

Based on your responses to the questions above, describe at least three things that you plan to do differently in preparing for the next exam. For instance, will you spend more time studying, change a specific study habit, or try a new one? Please describe.

Final Question: What can I do to help support your learning and your preparation for the next exam?

Goal Setting

An essential instructional strategy, effective even with students who claim to not be particularly interested in the content being presented, is getting them involved in goal-setting. Students who set their own goals are "more attentive to instruction, expend greater effort, and increase their confidence when they see themselves making progress" (Dembo & Eaton, 2000). Planning goes hand-in-hand with goal setting, and it's important to help students set thoughtful and strategic plans to carry out their goals.

- **Students Set Goals**--Help students set both long and short term learning goals that are both challenging and realistic: For example, for each unit, make it common practice for students to identify the long-term goal they hope to accomplish by the end of the unit. For many students, this will likely center around getting a good grade on an exam, paper, or other project—and that's OK, but you should also encourage students to set goals that don't focus solely on grades.
- Then ask students to break their long-term goal into several short-term, manageable goals so that they can more easily monitor and track their progress toward their bigger goal. For example, students might set short-term goals related to studying: how much time they will devote to studying each week and how they will go about doing that.
- **Students Monitor and Record Progress-**-Provide specific strategies students can use to meet their goals and have students monitor the strategies they use and reflect on their effectiveness.
- Students can and should set goals for a variety of activities. For example, before collaborative learning opportunities, ask students to set group and individual behavior goals and group product goals and outline ways to achieve those goals. Afterwards, ask student to reflect on those goals and modify, if necessary. Actively participating in the planning, carrying out, and discussion of and reflection on work within the group can increase students' engagement in the classroom and increase the productivity of collaborative group work.
- **Students Reflect on Progress**--Use question stems to help students reflect on their performance:
  - My goal was _____, and was/was not obtained because _____.
  - I have learned _____ and/or obtained the grade of _____because ____.
  - The strategy I used was effective/ineffective because _____.
  - To continue to improve, I need to change/modify _____ because _____.

Encouraging Positive Self-Talk

Students' self-efficacy and confidence in themselves and their ability to learn something new or complete a task greatly influence their motivation. When students are confident in their abilities and, most importantly, view errors as an informative part of learning something new, they are significantly more likely to persist in their attempts to complete a challenging task.

- Model positive self-talk: When working through a problem or difficult text, use the think aloud to model how the teacher, as a successful learner, deals with difficulties and uses trial and error to navigate problems. For example, "Now, this part looks complicated, but I'm sure we can figure it out.", or "Let's try and see if this will work."
- Focus feedback on processes, not outcomes. Verbal and written feedback should concentrate not on outcomes but on students' selection and use of learning processes and strategies. Doing this focuses students on what they can do to improve their work and gives them a sense of control over their academic success.
- Model the use of learning strategies while thinking aloud, so students are aware of the cognitive processes going on "behind the scene."
- During guided practice, monitor students' use of learning strategies and provide specific feedback.
- Once the task is completed, ask student to reflect on the strategies they used, whether or not they were effective, and why.
- Use the "bits-and-pieces approach" to make a large task less overwhelming and more manageable. Have students break work into numerous small sections and complete only small pieces at a time. This is an effective way to differentiate complete reading assignments. Rather than assigning a less complex piece to struggling readers, assign a smaller more manageable chunk.