

RESEARCH SUPPORTING THE STRATEGIES WITHIN THE FOUR STEP PLAN

Anthony J. Coletta, Ph.D.
Senior Staff Developer, Corn Associates
Professor of Education, William Paterson University

The Four Step Plan is a format, which is based on the latest cognitive research related to teaching and learning. Briefly, the Plan assists teachers in arranging and implementing planned learning experiences into a pedagogically sound approach that maximizes student learning. Specific teaching strategies are identified within each step to guide teachers in the implementation of the unit. Following is a description of the strategies teachers use in each step, including supportive citations from researchers:

Step 1 - CONNECT: Motivate Students by Connecting the Concept Under Study to Prior Knowledge.

It is critical that teachers begin lessons by finding a link or connection between the topic under study, and student's prior knowledge and experiences. This connection, often known as an "advance organizer" or "anticipatory set" is made easier when a meaningful concept within the topic is identified and related to what the students already know. As Jon Saphier (1997) states: "Learning is constructed as children assimilate new experiences with prior knowledge."

When teachers find a creative way to connect a core concept to students' prior knowledge, the brain opens up, sees meaning and is ready to place incoming information into long-term memory. The brain is continuously trying to make sense out of incoming information and experiences. As a result, one of the most brain-incompatible statements teachers can make is: "Open your science books to page 37." There is no connection to prior knowledge of a concept and the brain perceives no meaning. Studies show that pupils who connect new knowledge to prior knowledge are much more likely to retain the new knowledge in an organized fashion (Feden, 1993).

Therefore, when studying Butterfly Migration (Topic), teachers can select the concept of "Migrating" and connect it to student prior knowledge by asking questions related to student's personal experiences: Has anyone ever moved? From where have you moved? Why do people move? Similarly, the topic of South Africa can be studied by discussing the concepts of equality and inequality in their own lives. To the extent that teachers moderately "bump up" emotions, the brain fully attends.

As a rule, one topic and one concept are introduced and studied in one lesson. The idea is to avoid attempting to "cover" information and instead promote greater student understanding by going into more depth. As a result, teachers "uncover" a concept and avoid superficial "coverage." As Howard Gardner (1999) has stated, "Coverage is the enemy of comprehension."

Gardner has also described his theory of the nine "multiple intelligences," which provide a model for developing varied ways of connecting content to student prior knowledge. Linguistic intelligence, for example, suggests that fictional literature and poems can be used to stimulate prior knowledge. Or, students can sing or write songs (musical intelligence), solve a problem (logical-mathematical), discuss a current issue in small groups (interpersonal), reflect on personal experiences (intra-personal), or draw pictures (spatial). Since so many students appear to be strong spatial learners, creating visualizations is an especially important teaching strategy.

Visualizations increase student learning. Research has consistently shown that teachers most often present new knowledge through a linguistic mode. They either read or talk to students about new content. Yet, studies conclude that when teachers help students create visual (nonlinguistic representations), the effects on achievement are strong (Marzano, 2001). A variety of different types of visualization strategies help students "elaborate" or add to their knowledge, thereby promoting a deeper understanding of what they are learning. As humans, we once thought through pictures long before we thought through words. There is truth to the saying: "one picture is worth a thousand words." Teachers should use as many visual aids within a lesson as possible.

Among the visualization techniques to use are 1) guided imagery (Bagley, 1993) where students are taken on a journey in their minds. Also, 2) graphic organizers help children organize, interpret and understand content (Jacobson, 1999). A graphic organizer such as a storyboard might contain six rectangles, allowing the student to write or draw pictures of the correct sequence of events in a story. Similarly, the five steps involved in the scientific method can be written in the appropriate boxes. Finally, 3) pictures, drawings and short video clips.

Step 2 - LITERATURE/DISCUSS: Convey Expert Knowledge to the Students

Teachers can present information in either a "deductive" or an "inductive" manner. For example, when teaching about "air and air flow," a deductive approach involves the explicit presentation of basic principles of airflow, such as the Bernoulli Theories, and encourages the students to make predictions.

An inductive approach to teaching "air flow," however, would encourage the students to discover principles about air flow by first reading or conducting experiments, and then making predictions. Therefore, the teacher directly conveys expert knowledge within a deductive approach, and when teaching inductively, "sets the stage" and allows students to self-discover.

While both approaches are effective in producing learning, studies tend to conclude that deductive approaches produce higher test scores (Marzano, 2001). Yet inductive approaches tend to increase student motivation and learning and lead to more positive student dispositions.

One of the best ways of "deductively" conveying important knowledge is by reading selected parts of a good non-fiction, information book. Further, the teacher can use the chalkboard, overhead transparency, or PowerPoint to convey three to five major points linked to the concept under study.

This latter technique, known as "interactive lecturing" or a "participatory lecturette," (Feden, 1993) is a 10 to 15 minute lecture, interspersed with questions and brief student discussions. The teacher intermittently asks low and higher order questions and asks students to turn to a "Think, Pair, Share" partner to discuss the question for a period of one or two minutes before asking for responses.

An important part of Step 2 involves the teacher asking lower and higher-order questions (Foley, 1993; McTighe 1988). Teachers ask these questions following the presentation of information. Lower order questions check for student recall and descriptions of correct facts, dates, definitions and events. Higher order questions, however, encourage students to think of all the possibilities. There is usually more than one correct answer. Students think more deeply, and therefore, better understand and remember content. True thinking is done when the answer is not known.

The students' responses to higher order questions demonstrate one or more of the following behaviors: 1) apply information learned to their own experiences, 2) compare concepts with ideas and objects known to them, and 3) predict or create new ideas or solutions to a problem and 4) make personal judgments. Lower level questions are important and the content from such questions forms the foundation for higher order

thinking. However, studies show that higher order questions, where students have to apply, compare, conclude, predict, create and judge, produce deeper learning than lower level questions (Marzano, 2001).

Illustrated below is an example of how teachers can ask lower and higher level questions with an excerpt from a story, titled "Let A River Be" by Betty Sue Cummings:

"Ella Richards is a seventy-six-year-old woman who lives on the Indian River estuary. Dependent on catching and selling fish to sustain herself, she is, however, "imprisoned" by causeways, and angered by the sewers, pump-station overflows and storm water ditches carrying fertilizers.

Her river is slowly dying. Ella has dedicated her life to saving the Indian River. But, Ivan Maxwell, the entrepreneur of River property, is only interested in developing the river for the highest dollar, regardless of the pollution it brings."

Using Bloom's Taxonomy, teachers can ask students a variety of questions about "Let A River Be." Questions at the Knowledge and Comprehension levels are considered low-level because they require specific, correct answers. Levels 3 through 6, however, are considered to be higher-order questions that create more meaning and deeper understanding for students:

Low-Level Questions (Correct Answers):

1. Knowledge (recall): What causes pollution in the Indian River?
2. Comprehension (describe): Why does Ella want to clean up the River?

High-Level Questions (More Than One Correct Answer):

3. Application (apply): What can be improved in your environment?
4. Analysis (compare): How are Ella's thoughts about the River different from Ivan's?
5. Synthesis (create): What would be a new ending for Chapter Five?
6. Evaluation (judge): In your opinion, who has the stronger argument, Ella or Ivan? Why?

Within Step 2 teachers can use a variety of guided discussion strategies when asking higher order questions and eliciting responses from students. In fact, the way a teacher answers a question may be more important than the question. The teacher does something every time a student answers or does not answer a question. These responses set a tone that determines if students feel comfortable and are willing to talk without fear of criticism.

Most teachers need to slow down the pace of their teaching. If educators want students to think deeply, they have to slow their pace. They should also use "wait time" (Saphier, 1997), a pause of 5 to 7 seconds to allow students time to think. While waiting, teachers can look for non-verbal cues from students who want to speak but may be reluctant; these cues include making eye contact with the teacher, taking a deep breath and putting fingers to the mouth. The teacher calls on as many children as possible and encourages them to generate numerous possible responses.

Teachers engage in "scaffolding" (Berk, 1995) when they use guided discussion strategies that help students think more deeply about the topic. Extending student thinking occurs after a question is asked and the teacher follows-up with additional questions: "Can you tell me more? Can you give me an example? Who agrees

with Cindy? Who disagrees? Why? Who can summarize the most important thing said?" Vygotsky's (Berk, 1995) work reminds us of the intellectual growth which occurs in students when teachers engage in this type of follow-up questioning and social interaction.

Step 3A - PRACTICE: Allow students to practice specific reading, writing and math skills within the context of the topic.

During the practice phase of the Four Step Plan, teachers implement assignments that focus on the development of specific skills, usually in the areas of language arts and math. In a lesson dealing with either social studies or science content, the "practice" section allows for integration of language arts and math skills. Reading and writing skills, ranging from letter identification and vocabulary development to main idea and writing to summarize, inform or persuade, are taught through structured assignments, as are skills such as retelling, comparing, note taking and problem solving. In kindergarten through grade two, skills can be practiced within learning center activities.

In math, calculations and word problems may be assigned from textbooks or worksheets. Students can be placed into cooperative learning groups (Silberman, 1996) and practice their knowledge of content through review and question/answers. Also, music and art activities can be included as practice tasks. Practice tasks, according to Saphier (1997) should take a short amount of time. Long practice sessions with academic skills quickly reach a point of diminishing returns.

Step 3B - CREATE: Write and Evaluate a Performance Task and Rubric for Assessment

The performance task is the concluding part of the Four Step Plan. The performance task is a "real world," integrated learning experience, which is related to one or more statewide standard indicators. The task is part of a performance assessment model (Wiggins and McTighe, 1998) wherein students demonstrate the extent to which they can apply the knowledge and skills previously taught. The task is "real world" or authentic in that it includes knowledge and skills needed for success outside of schools.

The performance task also produces a product such as a book, letter, poster, newsletter, or power point presentation, etc. Teachers use a rubric (refer to the "Assessment" section below) to evaluate the quality of the completed task. The rubric is a format of criteria (Routman, 1995) that is shown to the students at the beginning of a lesson or unit of study. The criteria identify what the students work must include in order to receive a letter grade.

Following is an example of a fourth grade performance task, dealing with the United States Constitution. A generic writing rubric, used for grading, follows the task:

"You have just completed studying the United States Constitution in school. Your younger sister, overhearing you talking about the Constitution to a friend, asks you, 'But what does the Constitution really do for people?' You decide to write her a letter explaining as best you can, three of the most important benefits of the Constitution for average people. (*Standards: LA 3.3-4 Writes to inform; SS 6.1-4 Understands how the Constitution protects our rights.*)

A Generic Writing Rubric

Indicate the number which best describes the overall quality of written work. Allow the student to re-write the work in order to improve the score. *See adjacent page.*

General Writing Assessment Rubric

NUMBER	IDEAS	ORGANIZATION	WORD CHOICE	SENTENCE STRUCTURE	MECHANICS
4	<ul style="list-style-type: none"> • Original • Focused on a topic • Support details 	<ul style="list-style-type: none"> • Strong beginning, middle and end • Sequential and logical 	<ul style="list-style-type: none"> • Varied; words enhance ideas 	<ul style="list-style-type: none"> • Clearly written • Complete sentences • Variety of lengths 	<ul style="list-style-type: none"> • Few errors
3	<ul style="list-style-type: none"> • Some original ideas • General focus • Most supporting details included 	<ul style="list-style-type: none"> • Good beginning, middle and end • Most ideas sequenced and logical 	<ul style="list-style-type: none"> • Some variety • Words generally support idea 	<ul style="list-style-type: none"> • Most sentences clearly written • Simple sentences • Some variety of length 	<ul style="list-style-type: none"> • Some errors
2	<ul style="list-style-type: none"> • Few original ideas • Moves away from focus • Few supporting details 	<ul style="list-style-type: none"> • Attempts beginning, middle and end • Not always sequenced and logical 	<ul style="list-style-type: none"> • Common word choice • Some appropriate word choice • Little use of descriptive words 	<ul style="list-style-type: none"> • Some unclear sentences • Run-on, fragmented sentences • Little variety 	<ul style="list-style-type: none"> • Many errors
1	<ul style="list-style-type: none"> • Incomplete ideas • Unfocused • Lacks detail 	<ul style="list-style-type: none"> • Lacks beginning, middle and end • Little sequence and logic 	<ul style="list-style-type: none"> • Limited word choice • Inappropriate word choices • No attempt at descriptive words 	<ul style="list-style-type: none"> • Sentences not clear • Frequent fragmented sentences • No variety 	<ul style="list-style-type: none"> • Major errors
0	<ul style="list-style-type: none"> • No effort 	<ul style="list-style-type: none"> • No effort 	<ul style="list-style-type: none"> • No effort 	<ul style="list-style-type: none"> • No effort 	<ul style="list-style-type: none"> • No effort

Step 4 - PRESENT: Closure Through Student Presentations

Closure occurs when students summarize what was learned in the unit. Closure can be initiated by the teacher who might ask students to summarize the main points learned, or students can reach closure by completing a performance task and summarizing important findings through an oral presentation to the class. Presentations can be made individually, or in pairs or groups using different types of media such as Power Point. Teachers can choose to evaluate the quality of the oral presentations as well, using an appropriate rubric.

Assessment

In order to determine the extent to which students understood the unit concepts presented and in order to judge the quality of students writing and math skills, teachers use authentic assessments such as performance tasks, evaluated by rubrics. Student tasks are graded using the following marking system: P = Proficient; S = Satisfactory and NW = Needs Work. (In grades K-2, NT for "Needs Time" is used. Students receiving less than a "P" have the opportunity to improve upon their work and receive a better grade.

Accommodations for Special Needs Students

Accommodations need to be planned for "gray area" children (Goodman, 1994) whose reading and writing abilities are not functioning at the appropriate grade level. These are children who have difficulty paying attention, work at a slower speed and may lack social skills as well. Accommodations consist of the teacher's plans for meeting the individual needs of students through modifications of the learning experience planned for the entire class.

However, within the Four Step Plan format described herein, all the students receive instruction in the first two steps of the plan, i.e., Connect and Literature/Discuss. When the teacher plans the "practice tasks" and the "performance tasks," differentiated assignments are created for those children who might be frustrated with the task planned for the majority of the students (Mercer, 2001). Following are examples of the types of accommodations for special needs students that can be implemented:

- Provide students with a smaller amount of work (e.g., "Complete only the items with a star next to them")
- Draw a picture and discuss with the teacher before attempting to write
- Use a tape recorder to hear directions, read a story, or dictate responses
- For younger students, use rebus pictures for directions, tactile and kinesthetic activities such as sand and shaving cream for writing letters and singing and clapping activities
- Use more manipulative devices and board games and visual techniques such as graphic organizers, as discussed earlier
- Use computers with special software for special needs children, such as "E Reader," which supports challenged readers, and "Co-Writer," which is word prediction software for children who have difficulty writing.

Homework

Studies have shown that relevant and appropriate amounts of homework for students in grade six through twelve will increase school achievement. However, in the lower grades research concludes that there is a significant negative relationship between the amount of homework assigned and student attitudes. Teachers in kindergarten through the third grade should give much thought to the type and amount of homework they require. In all grades however, thoughtful homework assignments do develop and improve study habits (Marzano, 2001).

It is helpful to view homework assignments as meaningful tasks that would be given for the additional practice of skills or for the purpose of improving creativity, such as making an original invention or writing a

new ending to a story. In either event, homework should always be reviewed and discussed with the children as soon as it is completed.

CONCLUSION

The strategies within the Four Step Plan serve as a *Good Pedagogy* guide for teachers to use when implementing units of instruction. These techniques make teaching more conscious and purposeful. Teachers can read about, practice and discuss each strategy with other educators. Supervisors can be asked to provide feedback on specific strategies taught, when conducting a scheduled observation. As a result, the Four Step Plan assists teachers in systematically increasing their pedagogical skills.

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