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Assessment Brief



Public Schools of North Carolina

State Board of Education • Phillip J. Kirk, Jr., Chairman • North Carolina Department of Public Instruction • Michael E. Ward, Superintendent

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Understanding North Carolina Tests: Thinking Skill Level

Test Specifications Stage

The North Carolina Test Development Process consists of a series of unique stages. During the second stage of test development, NCDPI curriculum specialists, teachers, administrators, university professors, NCDPI testing consultants, and others establish the test specifications for each of the grade levels and content areas assessed. The definition and refinement of the content specifications for the tests are a continual process. One dimension used to classify test questions for North Carolina tests is the *thinking skill level*.

Thinking Skill Level

Thinking skill level describes the cognitive skills that a student must use to solve the problem. One test question may ask a student to classify several passages based on their genre (thinking skill: organizing); another question may ask the student to select the best procedure to use for solving a problem (thinking skill: evaluating).

In order to classify test questions by the thinking skill required, a framework to describe thinking skills must be used. The thinking skills framework used with the end-of-grade and end-of-course tests is from *Dimensions of Thinking* by Robert J. Marzano and others (1988). Many similar frameworks exist (for instance, that of Bloom), but *Dimensions of Thinking* was adopted by the North Carolina Department of Public Instruction in framing the revised *Standard Course of Study*. *Dimensions of Thinking* was developed through a collaborative process involving leading national experts in “thinking skills.” The framework reflects current thinking in cognitive psychology, education, and philosophy. It provides a practical framework for curriculum development, instruction, assessment, and staff development.

A visual representation of the framework and a brief description of each of the dimensions of thinking are located in this publication. The framework should be a useful reference for curriculum development, instructional design, and in-service training.

Brief Description of the Dimensions of Thinking

Metacognition. Metacognition refers to awareness and control of one’s thinking, including commitment, attitudes, and attention.

Critical and Creative Thinking. The terms “critical” and “creative” thinking are ways of describing how we go about thinking. The two are not opposite ends of a single continuum—rather, they are complementary.

- Critical thinking is “reasonable, reflective, thinking that is focused on deciding what to believe or do.” Critical thinkers try to be aware of their own biases and try to be objective and logical.
- Creative thinking is “the ability to form new combinations of ideas to fulfill a need” or to get “original and other wise appropriate results by the criteria of the domain in question.”

Thinking Processes. A thinking process is a relatively complex sequence of thinking skills.

- *Concept formation:* organizing information about an entity and associating that information with a label (word).
- *Principle formation:* recognizing relationships between or among concepts.
- *Comprehending:* generating meaning or understanding by relating new information to prior knowledge.
- *Problem solving:* analyzing and resolving a perplexing or difficult situation.
- *Decision-making:* selecting from alternatives.
- *Research:* conducting scientific inquiry.
- *Composing:* developing a product which may be written, musical, mechanical, or artistic.
- *Oral discourse:* talking with other people.

Core Thinking Skills. A thinking skill is a relatively specific cognitive operation that can be considered a “building block” of thinking. Items are classified by the following skills because they: (1) have a sound basis in research and theoretical literature, (2) are important for students to be able to do, and (3) can be taught and reinforced in school.

Dimensions of Thinking*

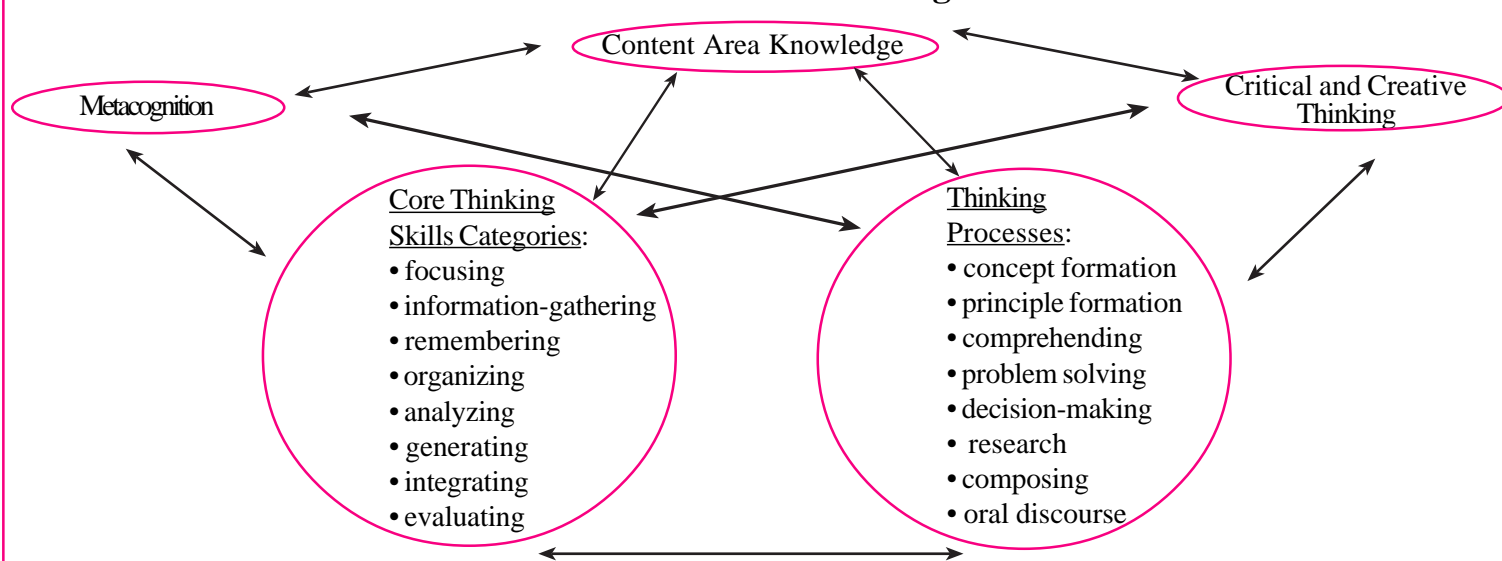


Figure 1. Thinking skills framework used with the North Carolina End-of-Grade and End-of-Course Tests (adapted from Robert Marzano et al., *Dimensions of Thinking*, 1988).

KNOWLEDGE (1)

Focusing Skills—attending to selected pieces of information and ignoring others.

1. *Defining problems:* clarifying needs, discrepancies, or puzzling situations.
2. *Setting goals:* establishing direction and purpose.

Information-Gathering Skills—bringing to consciousness the relevant data needed.

3. *Observing:* obtaining information through one or more senses.
4. *Formulating questions:* seeking new information through inquiry.

Remembering Skills—storing and retrieving information.

5. *Encoding:* storing information in long-term memory.
6. *Recalling:* retrieving information from long-term memory.

ORGANIZING (4)--arranging information so it can be used effectively.

7. *Comparing:* noting similarities and differences between or among entities.
8. *Classifying:* grouping and labeling entities on the basis of their attributes.
9. *Ordering:* sequencing entities according to a given criteria.
10. *Representing:* changing the form but not the substance of information.

APPLYING (5)—demonstrating prior knowledge within a new situation. The task is to bring together the appropriate information, generalizations or principles that are required to solve a problem.

ANALYZING (6)—clarifying existing information by examining parts and relationships.

11. Identifying attributes and components: determining characteristics or parts of something.
12. Identifying relationships and patterns: recognizing ways in which elements are related.
13. Identifying main idea: identifying the central element; for example, the hierarchy of key ideas in a message or line of reasoning.
14. Identifying errors: recognizing logical fallacies and other mistakes and, where possible, correcting them.

GENERATING (7)—producing new information, meaning, or ideas.

15. *Inferring:* going beyond available information to identify what reasonably may be true.
16. *Predicting:* anticipating next events, or the outcome of a situation.
17. *Elaborating:* explaining by adding details, examples, or other relevant information.

INTEGRATING (8)—connecting and combining information.

18. *Summarizing:* combining information efficiently into a cohesive statement.
19. *Restructuring:* changing existing knowledge structures to incorporate new information.

EVALUATING (9)—assessing the reasonableness and quality of ideas.

20. *Establishing criteria:* setting standards for making judgments.
21. *Verifying:* confirming the accuracy of claims.

*Marzano, R.J., Brandt, R.S., Hughes, C.S., Jones, B.F., Presseisen, B.Z., Stuart, C., & Suhor, C. (1988). *Dimensions of Thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.