Purpose
Form 7 of CogAT assesses the level and pattern of cognitive development of students from kindergarten through grade 12. The test measures general and specific reasoning abilities in three domains: verbal, quantitative, and nonverbal. These abilities reflect the overall efficiency of cognitive processes and strategies that enable individuals to learn new tasks and solve problems. Because these abilities are closely related to an individual’s success in school in virtually all subjects, CogAT results are helpful in planning effective instructional programs and adapting instruction to enhance the student’s chances of success in learning.

How to get CogAT result reports

1. Login in to Data Manager (riversidedatamanager.com)
2. Click the App Switcher and select Reports
3. Click “Create a Report”
4. Make report selections by clicking the blue colored text anywhere under “Select Report Criteria”
5. Click “Run in Background” or “Run Report” (this selection is not available for all report types).
6. Retrieve reports by clicking the “Report Center” link.
   Start over by creating a new report. You cannot do anything wrong here, so experiment, and see what is available.
This manual is setup for you to find what you are looking for without reading cover-to-cover. While reading the entire manual would be informative, you can also use the table below to find and read those sections most related to your need.

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*NOTE – This guide is an abbreviated version of 2 full length guides available on the Data & Assessment website or with Data Manager Digital Resources. If you want additional information the full version of the guides are good resources.

From the District Website, Under Teaching & Learning select “Data & Assessment”

Then, select CogAT from the menu on the left.
In Brief

A primary use of CogAT is to guide efforts to adapt instruction according to students’ needs and abilities. The key to adapting instruction is the ability profile, an indicator that is derived from the level and pattern of each student’s CogAT scores.

This part of the guide focuses on what you need to know and do to adapt instruction using CogAT ability profiles. It explains:

- things to do before you interpret and act on test results
- the meaning and components of the ability profile
- general principles about adapting instruction
- instructional suggestions based on both the overall level of ability and the particular pattern of strengths and weaknesses students display

Adapting Instruction – Principles

Success in school depends on many personal & social factors, two of these factors matter most:

- the student’s current knowledge and skills
- the student’s reasoning abilities using verbal, quantitative, and spatial concepts

CogAT measures reasoning abilities in all three domains—verbal, quantitative, and nonverbal—which is why it is so helpful in guiding efforts to adapt instruction and improve learning outcomes. This section summarizes the following research-based principles that guide instructional adaptation:

- build on strength
- focus on working memory
- scaffold wisely
- encourage strategic thinking
- when grouping, aim for diversity

The remainder of this part of the guide offers suggestions based on these principles and specific to a student’s CogAT ability profile.

Build on Strength

When a student is weak in one area but strong in another, a general rule is to build on the strength. Students are better able to process information when tasks emphasize the type of thinking they do best.

When adapting instruction to build on strengths, follow these guidelines:

- Instruction geared to a strength should challenge that strength. It should encourage students to go beyond the information given, not merely register it.

- Frequently, students must learn to perform tasks that they do not do well. In such cases, emphasize aspects of the tasks that avoid their weakness until the students have established a foothold.
For example, consider students who have difficulty learning computation skills but who show strength in verbal reasoning. Using group oral recitation and encouraging students to talk through math problems will emphasize their verbal strength more than silent practice on computation.

**Focus on Working Memory**

When students are required to remember and do more things than they are capable of remembering and doing at one time, they generally fail. In cognitive terms, their *working memory* is overloaded.

As they learn, students must understand, temporarily store, and then transform new information in some way. All three of these processes require working memory, which is a limited resource.

Effective use of working memory is critical for successful reasoning. Students cannot make inferences about how two or more ideas are connected if they cannot hold the ideas in their working memory while trying to compare them.

Indicators that a student’s working memory is overloaded include the following:

- inability to recall and complete a list of oral instructions
- skipping or repeating parts of a task
- task abandonment and frustration

Working memory has a limited capacity. When helping students who are unfamiliar with a task or who have difficulty learning, aim to reduce the burden on working memory while maintaining the integrity of the lesson content.

Two important questions for educators to ask are:

- “What are the major demands that this activity places on the students’ working memories?”
- “Which of these memory requirements can be offloaded or scaffolded?”
**Scaffold Wisely**

Whenever students try to solve problems, many processes must be executed simultaneously in working memory. **Scaffolding wisely** means offloading, at least for the moment, those memory requirements and processes that are not the object of the instructional activity.

For example, the demands of spelling and grammar can easily overwhelm the working memory resources of a beginning writer. Temporarily offloading these demands frees the student to write a connected narrative.

Similarly, one of the last steps in the acquisition of skills is learning to monitor one’s own performance. Especially in the early stages of skill acquisition, monitoring functions can be offloaded to another individual by having students work in pairs. Using checklists, writing things down, drawing pictures, and practicing a skill until it can be performed automatically also reduce demands on working memory.

When working with students who have difficulty making inferences, deductions, and elaborations, avoid the temptation to make things easy by offloading the **reasoning** requirements of the tasks. This strategy works well in the short run but leaves students increasingly unprepared to face future challenges of school learning. When reasoning is an essential part of a task, find ways to support and guide learners without offloading their need to reason.

**Encourage Strategic Thinking**

Psychologists who study reasoning distinguish between two types of reasoning processes:

- **Tacit processes** occur outside awareness. They typically do not require much attention and are performed quickly and intuitively.

- **Intentional processes** require conscious awareness. Intentional thinking is often described as effortful and rule-based.

For example, skilled readers use **tacit reasoning processes** to understand much of what they read. They retrieve word meanings quickly and automatically build mental images that help them keep track of the meaning of a passage as they move from one sentence to the next. Beginning readers, on the other hand, use **intentional reasoning processes** to understand the meaning of both individual words and of the sentences that they make, often relying on illustrations rather than their own mental imagery.

Reasoning processes are most useful when students learn to use them strategically. At the lowest level, this means simply having a strategy that one can consciously use when necessary. At an intermediate level, it means having multiple strategies available for possible use. At a more advanced level, it means knowing under which circumstances each strategy is best used. And at the highest level, it means becoming strategic and reflective in one’s thinking.

Instructional adaptations are most effective over the long haul if they help learners become more intentional and self-regulated in their learning. Encouraging students to use and monitor the effectiveness of different strategies helps them better leverage their strengths and avoid, or scaffold, their weaknesses.
**When Grouping, Aim for Diversity**

*CogAT* results should not be used to routinely group students by score levels or by ability profiles. Students are most likely to improve their ability in a domain if they have the benefit of learning from classmates whose skills and approaches to problems differ from their own.

Working with students of different ability levels is particularly important for students who have a marked deficit in one area. Improvement is more likely if such students have high-quality interactions with individuals who have a relative strength in the same area than if they are constantly paired with other students who, like themselves, have difficulty in that domain.

More-able students benefit from such groups to the extent that they are asked to provide explanations and assistance. Note, however, that highly academically talented students can benefit from being grouped with other high-ability students in classes that offer advanced or accelerated learning.

**Adapting Instruction for Different Ability Levels**

A student’s *CogAT* ability profile is the key to designing effective instruction for that student. This section of the guide offers suggestions on instructional strategies based on the **median age stanine** (overall cognitive ability level) indicated by the student’s ability profile.

Guidance based on **relative strengths and weaknesses** identified in the ability profile (verbal [V], quantitative [Q], and nonverbal [N] cognitive domains with a plus or minus sign) begins on page 25.

**Instructional Strategies by Ability Level Groupings**

For all students, begin by considering the overall ability level indicated by the ability profile. The number that begins each ability profile is the median age stanine that the student obtained on the three *CogAT* batteries. For example, if the student has stanines of 7, 3, and 6 for the Verbal, Quantitative, and Nonverbal batteries, respectively, that student’s median age stanine is 6.

The tables on the following pages present information on four groups of students based on their median age stanines.

<table>
<thead>
<tr>
<th>Stanine</th>
<th>Reasoning Ability Level</th>
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</thead>
<tbody>
<tr>
<td>9</td>
<td>Very high</td>
</tr>
<tr>
<td>7–8</td>
<td>Above average</td>
</tr>
<tr>
<td>4–6</td>
<td>Average</td>
</tr>
<tr>
<td>1–3</td>
<td>Below average</td>
</tr>
</tbody>
</table>

You can obtain more information on a specific ability profile by using the Interactive Ability Profile Interpretation System. This tool is available at the following website: [www.riversidepublishing.com/products/group/cogat6/input.jsp](http://www.riversidepublishing.com/products/group/cogat6/input.jsp)
**Learner Characteristics**

<table>
<thead>
<tr>
<th>Students with...</th>
<th>Typically exhibit the following learning characteristics:</th>
</tr>
</thead>
</table>
| Below-average reasoning abilities (Stanines 1–3) | • difficulty learning abstract concepts  
• minimal or ineffective strategies for intentional learning and remembering  
(Therefore, they tend to approach learning tasks in a trial-and-error fashion.)  
• a tendency to spend little time planning before attempting to solve a problem  
(As a result, they frequently do not transfer knowledge and skills learned in one context to another context unless prompted to do so.)  
• difficulty detecting relationships, similarities, and differences that go beyond appearances  
• a tendency to be easily distracted by salient but irrelevant details in problems |
| Average reasoning abilities (Stanines 4–6) | • frequent use of words that are correct but do not precisely describe a concept or relationship  
• likely to use only previously learned methods when faced with new tasks  
• difficulty transferring knowledge and skills when tasks look different from those previously learned |
| Above-average reasoning abilities (Stanines 7–8) | • ability to learn relatively quickly  
• good memory and effective learning strategies  
• typically less need to practice to master a skill compared with average students |
| Very high reasoning abilities (Stanine 9) | • preference for discovery learning rather than highly structured learning environments  
(When adapting instruction for these students, realize that good discovery learning need not be a solitary task.)  
• need for the company of other learners who model new ways of understanding a problem and who challenge these learners to improve their current understanding |
## Build on Strengths

<table>
<thead>
<tr>
<th>For students with...</th>
<th>Guidelines for Adapting Instruction</th>
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</thead>
<tbody>
<tr>
<td>Below-average reasoning abilities</td>
<td>Look for strengths in terms of specific interests and achievements. Even more than other students, those who are behind their peers in reasoning abilities often learn more and sustain their efforts longer if the teacher discovers and builds on their interests. It is not always possible or even desirable to bend all learning to suit a student’s interests; to the extent that it can be done, it will lead to greater effort and a generally more sophisticated outcome. Identify and emphasize other competencies these students have, especially when students are working in groups. For example, these students may be able to help draw a poster that summarizes the group’s discussion or take the lead role in a demonstration. Using their skills helps legitimize the students’ participation in the group. Students who feel that they are participants (rather than observers) have higher levels of motivation and engagement in a task.</td>
</tr>
</tbody>
</table>
| Average reasoning abilities                | Although these students have good resources for learning, they often have difficulty applying what they know when learning a new task, particularly when it looks different from tasks that they have previously learned. Consider the following instructional adaptations for these students:  
  - Recognize that their strengths will primarily be evident in their interests and, to a lesser extent, in their levels of achievement in different domains.  
  - Find ways to encourage and acknowledge the particular academic accomplishments of these students.  
  - Help them develop the habit of analyzing new tasks to detect relationships with previously learned tasks. Do this by modeling the process for them. |
| Above-average reasoning abilities          |  
  - Recognize that these students generally profit most when allowed to discover relationships themselves. Guided discovery methods work better than more structured teaching methods.  
  - Challenge them with materials, projects, and problems that are somewhat more difficult than those used for the typical student.  
  - Improve their reasoning skills by encouraging them to precisely describe the relationships among concepts or the rules that sequence them. For example, in writing, encourage students to find words that express ideas exactly rather than approximately.  
  - Encourage these students to follow their interests, and reward perseverance on long-term projects. |
| Very high reasoning abilities               | The single greatest need of very able students is for academic challenge at a level commensurate with their abilities and achievements. Consider the following instructional adaptations for these students:  
  - Carefully select challenging instructional materials, special projects, or other enrichment activities.  
  - Offer instruction, particularly in mathematics, at a level that may be several years in advance of that received by age-mates. |
## Focus on Working Memory

<table>
<thead>
<tr>
<th>For students with…</th>
<th>Guidelines for Adapting Instruction</th>
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</thead>
</table>
| Below-average reasoning abilities (Stanines 1–3) | Students with poor reasoning skills can reap great benefits when you can reduce the demands on their working memory. Be aware of these limitations:  
- These students are easily overloaded. A lesson may start out meaningfully but soon degenerate into an anxious search for surface features of tasks that suggest a solution.  
- The primary burden on working memory comes from an overload of concepts, images, sounds, and words that must be held in mind. The most effective way to improve performance is to reduce the number of things that must be held simultaneously in working memory.  
For example, some students have difficulty relating what they hear to what they see or coordinating what is on the board with what is on the paper in front of them. Eliminating the need to remember ideas, even temporarily, can greatly assist these students.  
- Reduce burdens on working memory with instructional methods such as these:  
  - Use familiar concepts and make concrete analogies to familiar physical systems.  
  - Offload items to be remembered or processes that must be performed simultaneously.  
  - Provide ample structured practice so that skills such as writing, typing, or calculating become automatic. |
| Average reasoning abilities (Stanines 4–6) | These students are frequently working at the limits of their mental-processing resources. Reducing the burden on working memory can have a significant effect on their success in learning. When possible, make modifications to instructional methods such as these:  
- Put all the needed information on a single sheet of paper.  
- Use familiar, concrete concepts rather than unfamiliar, abstract symbols.  
- Provide ample practice so that students master skills that assist in problem solving and comprehension.  
- Offload performance monitoring to another individual by having students work in pairs. Self-monitoring skills are especially troublesome for these students, particularly in the primary grades. Offloading monitoring can be especially effective early in the process of acquiring a new skill or strategy.  
Burdens on working memory change dramatically as these students gain proficiency with a skill. What is initially overwhelming can be, with practice, well within a student’s range. |
| Above-average reasoning abilities (Stanines 7–8) | The following techniques optimize the use of working memory for these students:  
- Temporarily offload self-monitoring to another student or to the teacher. Although these students need less practice than average students to master new skills, they acquire complex skills more readily when relieved of the need to self-monitor. |

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Focus on Working Memory, continued

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<tr>
<th>For students with…</th>
<th>Guidelines for Adapting Instruction</th>
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</table>
| Above-average reasoning abilities (Stanines 7–8), continued | • Break highly complex tasks into a series of simpler tasks or skills. Provide focused practice on those components until the student masters the low-level skills. Then sequence and combine those skills, building up to the complex task.  
• Teach students how to monitor their own thinking and problem solving by recording their thoughts on paper. Show them how studying the written record allows them to focus, reflect, revise, and clarify their thinking. |
| Very high reasoning abilities (Stanine 9) | When helping these students acquire new academic skills, consider these adaptations:  
• Encourage mindful and self-regulated learning, even for students in early primary grades.  
• Let them try different skill-acquisition strategies and monitor the effectiveness of each. |
# Scaffold Wisely

<table>
<thead>
<tr>
<th>For students with…</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below-average reasoning abilities (Stanines 1–3)</td>
<td>Students with <strong>above-average</strong> reasoning abilities know what to attend to and what to ignore when trying to understand a problem, but students with poorly developed reasoning abilities often have difficulty identifying what is important to learn and judging where they should focus their attention in a learning situation. Be aware of these limitations:</td>
</tr>
<tr>
<td></td>
<td>• These students need very specific directions before they start a task or start to study. Attention-getting directions can help students focus on important aspects of a task, particularly in reading.</td>
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<tr>
<td></td>
<td>• They learn more effectively in structured learning environments that make fewer demands on their cognitive resources and provide more direct guidance, coaching, and support.</td>
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<td></td>
<td>• They tend to process information slowly and need a slower pace of instruction than do students with higher stanine scores. For these students, “doing” works better than talking about it.</td>
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<td></td>
<td>• Instructional strategies likely to be more effective than verbal explanations include:</td>
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<tr>
<td></td>
<td>– teacher- or peer-modeling</td>
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<td></td>
<td>– concrete representations of abstract concepts</td>
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<td>– demonstrations and hands-on activities</td>
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<td>– pictures or other types of illustrations, videos, and three-dimensional models</td>
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</tbody>
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### Scaffold Wisely, continued

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<thead>
<tr>
<th>For students with…</th>
<th>Guidelines for Adapting Instruction</th>
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</thead>
<tbody>
<tr>
<td>Below-average reasoning abilities (Stanines 1–3), continued</td>
<td>When designing instruction for these students, beware of the tradeoff between short-term gains and long-term competence. Highly structured environments that remove the information-processing burden from these learners usually result in higher immediate achievement but can leave these students even less prepared to cope with future learning challenges. Instead, adapt instruction to scaffold lower-order processes and memory burdens in order to encourage the development of reasoning abilities for these students.</td>
</tr>
</tbody>
</table>
| Average reasoning abilities (Stanines 4–6) | Students with average reasoning abilities tend to learn most effectively in the following conditions:  
- school environments that are somewhat, but not highly, structured  
- instruction that is moderately paced and provides frequent monitoring and feedback on their progress  
The goal of good instruction is to provide students with enough support in the form of strategies, memory prompts, and task structure so they can infer, deduce, connect, and elaborate (in short, so they can understand and think for themselves). |
| Above-average reasoning abilities (Stanines 7–8) | These students typically have effective learning strategies in place and are generally good at recognizing when they need help in order to accomplish a task. They can benefit from:  
- instruction that helps them plan the use of different strategies in different contexts  
- working with more-able peers, particularly on difficult problems or learning tasks  
- guidance on using more effective strategies or implementing strategies correctly |
| Very high reasoning abilities (Stanine 9) | Very able students need access to instruction that allows and encourages them to develop their academic skills. Some also need help coping with negative feelings, such as anxiety. Learning to persist in the face of difficulty can also be an important affective or motivational issue for very able students. Working with an older and more experienced student (or adult) can be especially beneficial. |
## Encourage Strategic Thinking

<table>
<thead>
<tr>
<th>For students with…</th>
<th>Guidelines for Adapting Instruction</th>
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</thead>
</table>
| Below-average reasoning abilities (Stanines 1–3) | Because these students often have considerable difficulty identifying appropriate situations in which to use a particular strategy, follow these guidelines for teaching them learning strategies:  
  - Use modeling and demonstration during ongoing learning situations in the classroom.  
  - Enlist more-able peers to provide the guidance these students need to focus on relevant aspects of a task, to keep track of what they are doing, and to avoid practicing errors.  
  - To help students become more reflective in their learning, focus on a few good strategies rather than on a detailed list of rules.  
  - Once students have learned how to apply a strategy in a particular context, provide opportunities for them to apply it in other contexts.  
  - During the early phases of skill acquisition, carefully monitor students who have difficulty monitoring themselves and who are susceptible to making errors to ensure that they understand the procedure or strategy and are applying it correctly. |
| Average reasoning abilities (Stanines 4–6) | When these students learn to be more strategic in their thinking, memory burdens are reduced and thinking leads to better results. Common challenges encountered and instructional methods to help students overcome them include the following:  
  - Frequent errors in implementing learning strategies  
    - Provide frequent monitoring when the students are learning a new strategy so that any errors can be corrected early and not practiced.  
    - Model correct implementation of a strategy rather than describing it.  
  - Lack of effective study skills  
    - Provide direct instruction in study skills such as note taking, outlining, diagramming, and planning use of time.  
    - Formulate questions to guide their study.  
  - Inability to solve complex problems  
    - Show students how to break up complex problems into simpler units.  
    - Provide tools and methods for tracking their progress in solving complex problems.  
    - Help students become mindful of their own strengths and weaknesses and of the effectiveness of different strategies in different contexts. |
| Above-average reasoning abilities (Stanines 7–8) | Able students are quick to acquire different learning strategies. The following approaches are suggested for these students:  
  - Expose them to alternative strategies, especially if modeled by respected adolescents and adults. Help students appreciate the value of different strategies for different purposes and problems.  
  - Encourage students to try each modeled strategy and help them keep track of the results. As students progress beyond middle school, encourage them to expect changes in strategies that work best for learning. |

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### Encourage Strategic Thinking, continued

<table>
<thead>
<tr>
<th>For students with…</th>
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</table>
| Very high reasoning abilities (Stanine 9) | Very able students are generally receptive to activities that allow them to discover how they can best use their cognitive resources. **For students in the early primary grades**, this can mean learning not only that there are different ways to attain competence in performing a skill, memorizing poetry, or solving problems, but also that learners have the option of discovering which methods work best for them.  
**For older students**, the emphasis should be on developing a willingness to expand their reasoning abilities in these ways:  
- Reflect on existing knowledge to compare, contrast, and internalize new information.  
- Shift perspectives and consider alternative opinions and evidence.  
- Entertain increasingly sophisticated theories of what counts as knowledge and evidence. |
## When Grouping, Aim for Diversity

<table>
<thead>
<tr>
<th>For students with…</th>
<th>Guidelines for Adapting Instruction</th>
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</thead>
<tbody>
<tr>
<td>Below-average reasoning abilities (Stanines 1–3)</td>
<td>These students should not be segregated in classes or groups consisting solely of other low-scoring students. Those who have difficulty reasoning when alone typically learn more effectively and have higher levels of achievement when they have many opportunities to interact with more-able peers. Students who have not yet learned how to participate fully in an activity can learn much by observing and doing what they can.</td>
</tr>
</tbody>
</table>
| Average reasoning abilities (Stanines 4–6) | Many cognitive skills are learned first by observing other students interacting and then by gradually learning to participate in the same sort of exchanges. Plan group activities with these guidelines in mind:  
- Try to structure group interactions so that all students have an equal opportunity to participate. (Research shows that students with average abilities are often left out of group problem-solving efforts.)  
- Structure groups so that more-able students model higher-order skills (via student conversations) before group members practice the skills. Only after much overt practice can a skill be internalized and then executed covertly (that is, cognitively). |
<p>| Above-average reasoning abilities (Stanines 7–8) | Above-average students are generally excellent group participants, especially if the group is structured so that no one can dominate the discussion or be left out of it. These students can learn well in groups by explaining, by helping to summarize discussions, and by modeling higher-order thinking skills for other students. |</p>
<table>
<thead>
<tr>
<th>For students with…</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
</table>
| Very high reasoning abilities (Stanine 9) | Very able students can benefit from group interactions when they are able to explain difficult concepts to other students, but they learn more when they are able to participate as learners as well.  
When grouping very able students with other students, try to devise groups that provide them with the following experiences:  
- They will be learners, not just explainers.  
- They will be challenged by a diversity of perspectives among participants. |
Adapting Instruction to Build on Relative Strengths

Approximately half of the students who take CogAT show a relative strength or a relative weakness in one of the three test batteries. Understanding this provides the opportunity to adapt instruction to build on the student’s strengths and shore up any weakness.

Ability profiles with a V+, Q+, or N+ indicate a relative strength on the Verbal, Quantitative, or Nonverbal Battery, respectively.

Profiles that show a relative strength are more common for low scores (median age stanines of 1, 2, or 3) than for high scores (median age stanines of 7, 8, or 9).

Profiles are especially important for understanding the abilities of the least-able students. Profiles that show an extreme strength (E+) are most common for students with a median stanine of 1. In fact, for students with a median age stanine of 1, profiles that show a significant or extreme strength are almost as common as profiles that show a relatively flat (A) profile. Both occur for about 45 percent of students nationally. The information that follows offers suggestions on adapting instruction to build on a relative strength indicated by a student’s CogAT ability profile.

<table>
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<tr>
<th>Relative Strength</th>
<th>Cognitive Domain</th>
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<td>Verbal</td>
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</tr>
<tr>
<td>Q+</td>
<td>Quantitative</td>
<td>18</td>
</tr>
<tr>
<td>N+</td>
<td>Nonverbal</td>
<td>19</td>
</tr>
</tbody>
</table>
## Relative Strength in Verbal Reasoning (V+)

<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learner Characteristics</strong></td>
<td>These students typically obtain higher-than-expected achievement test scores in all areas except mathematical computation. The differences between observed and expected achievement are smallest at the primary level and largest at the secondary level. A strength in verbal reasoning has this broad effect on achievement because verbal reasoning abilities are important for success in virtually all school subjects.</td>
</tr>
<tr>
<td><strong>Relative Strength</strong></td>
<td>Indicators of a relative strength in verbal reasoning include the following:</td>
</tr>
<tr>
<td></td>
<td>- The students generally do best when they are encouraged to talk and write about what they are attempting to learn.</td>
</tr>
<tr>
<td></td>
<td>- These students often have remarkably good memories for arbitrary sequences of sounds, letters, words, and events. Thus, they typically are above average in spelling; in their knowledge of syntax and grammar; in their ability to learn other languages; and in their ability to remember dialogue, prose, and poetry.</td>
</tr>
<tr>
<td><strong>Building on Strength</strong></td>
<td>Instructional opportunities to build on students’ strength in verbal reasoning include the following:</td>
</tr>
<tr>
<td></td>
<td>- Offer greater challenges in areas of the curriculum that involve reading, writing, and speaking. At the elementary level, this may mean providing special reading or writing assignments that are more demanding than the assignments given to other students. At the secondary level, if scores on the Verbal Battery are particularly high (stanine 8 or 9), it may mean placement in honors or advanced-placement classes.</td>
</tr>
<tr>
<td></td>
<td>- Encourage these students to use their superior verbal reasoning skills to achieve at higher levels in other curricular areas, particularly in mathematics. For example, these students will often learn best if encouraged to restate mathematical expressions verbally and to explain them to others.</td>
</tr>
<tr>
<td></td>
<td>- Avoid this pitfall in mathematics: Students with relatively strong verbal abilities often find it easier to memorize formulas than to build more abstract, often spatial mental models of the same conceptual systems. It is the latter that leads to long-term retention of mathematical concepts and, more importantly, to the ability to transfer mathematical knowledge to unfamiliar domains. Take steps to discourage these students from simply memorizing formulas. The use of computers with graphing capabilities can help in this respect. Most importantly, use learning materials and test problems that allow these students to use their excellent verbal reasoning skills instead of their rote memories when learning mathematics.</td>
</tr>
<tr>
<td></td>
<td>- Especially at the primary and early elementary levels, encourage these students to practice mathematical facts orally rather than silently. Consider how one best learns common replies to questions posed in a foreign language and try using similar methods here. Expect that these students will need more practice for mastering mathematical skills than they need for mastering reading and language skills.</td>
</tr>
</tbody>
</table>

*Continued on next page...*
### Relative Strength in Quantitative Reasoning (Q+)

<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
</table>
| **Building on Strength, continued** | • Encourage the habit of creating a mental model and coordinating it with a verbal description. These students sometimes have difficulty creating a visual mental model of the scenes depicted in a story. Read aloud to such students, pausing frequently to respond to their questions or to ask what they envision. Select texts with illustrations and ask students to make explicit connections between the text and the illustration.  
• For young students or for those who still have difficulties understanding stories, allow them to model the situation described in the story and then to alter the model as changes occur in the text. Their goal is to learn how to create a visual mental model that allows them to keep track of the persons and events described in the text. If students are able to read and write about events that occur in locations that they know well, illustrations may not be needed. |

<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learner Characteristics</strong></td>
<td>Students in the primary grades who show a strength in quantitative reasoning tend to score somewhat higher than expected (on the basis of their verbal and nonverbal reasoning abilities) on both the mathematics and language portions of standardized achievement tests. By the elementary years, however, the advantage is confined to mathematics and persists through the high school years.</td>
</tr>
</tbody>
</table>
| **Relative Strength** | Indicators of a relative strength in quantitative reasoning include the following:  
• Students are capable of abstract thinking. At lower ability levels, a quantitative strength may be apparent in the student’s abilities with the computational aspects of mathematics rather than the conceptual aspects.  
• Students who display high levels of quantitative reasoning abilities typically excel in identifying patterns from their experiences and then reasoning by using their abstractions.  
• They often learn computer skills more readily than their peers, especially skills such as procedures for using text editors and spreadsheets. They do not typically excel at computer programming unless their quantitative reasoning abilities are quite high.  
• Students who excel at learning rule-based mathematical knowledge often show better-than-expected knowledge of grammar. |
| **Building on Strength** | Instructional opportunities to build on a strength in quantitative reasoning include the following:  
• Exploit and further develop this ability. If quantitative reasoning scores are very high, this may mean acceleration for some students; others benefit from enrichment activities such as math clubs or honors classes. Selecting appropriate strategies requires knowledge of a student’s level of achievement in mathematics and of personal factors such as anxiety about working with older students. |
Relative Strength in Quantitative Reasoning (Q+), continued

<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
</table>
| Building on Strength, continued | • Provide opportunities for these students to contribute at high levels to group projects. A strength—especially an extreme strength—in quantitative reasoning can be a source of great pride. Group projects provide an avenue for building better verbal and spatial reasoning abilities.  
• If students have strong grammar skills, praise this strength and ask the students to give feedback on each other’s writing. This activity, in turn, can help these students acquire knowledge of higher-level writing skills (such as principles of style or organization).  
• Encourage development of their abilities through mathematical tasks, games, and puzzles that can be engaged in cooperatively rather than competitively. |

Relative Strength in Nonverbal Reasoning (N+)

<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner Characteristics</td>
<td>Students who show a relative strength on the Nonverbal Battery can be either very good at reasoning with spatial stimuli or particularly adept at solving novel problems that are unlike those encountered in school. Choosing between these explanations often requires information outside the test results (for example, knowledge of a student’s learning style and extracurricular activities of choice and, for older students, their career interests). Students with particularly strong spatial abilities often experience difficulties in verbal fluency (as when writing under time pressure or speaking extemporaneously) or in remembering sequences of words or letters (as in spelling). On the other hand, these students often excel at drawing, sculpting, and other visual and mechanical arts. Another possibility is that this profile represents not so much a strength in spatial reasoning as a weakness in both verbal and quantitative reasoning abilities. These students need activities both in and out of school that will develop their verbal and quantitative reasoning abilities. For suggestions on improving these areas, see “Adapting Instruction to Shore Up Weaknesses,” beginning on page 30. Paradoxically, students who have a relative strength on the Nonverbal Battery tend to obtain lower scores on some portions of standardized achievement tests than those of students with the same levels of verbal and quantitative abilities but an N+ profile. Most achievement tests do not measure spatial reasoning. A strength in preference for spatial reasoning runs counter to the predominantly linear and verbal modes of thinking required by conventional schooling. Although much effort is directed toward the development of students’ verbal and, to a lesser extent, quantitative reasoning abilities, very little effort is made to develop their spatial reasoning abilities. Yet these abilities routinely play an important role in high-level learning and in creative contributions in mathematics, science, engineering, and the visual arts. Like verbal and quantitative reasoning abilities, spatial reasoning abilities respond to instruction.</td>
</tr>
</tbody>
</table>

Continued on next page...
**Relative Strength in Nonverbal Reasoning (N+), continued**

<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner Characteristics, continued</td>
<td>Students with a nonverbal strength often perform less well on tasks that require verbal fluency, such as speaking and writing. Indeed, extremely high levels of spatial ability are associated with a diverse array of specific verbal problems such as stuttering, difficulty learning phonics, poor spelling, and difficulty speaking foreign languages.</td>
</tr>
</tbody>
</table>

| Relative Strength | The suggestions in this section are based on the interpretation that the N+ profile represents a strength in spatial thinking. Indicators of a relative strength in nonverbal reasoning include the following:  
- Students tend to prefer visual mental models when solving problems. They respond well to texts that contain difficult graphics and prefer maps to verbal directions.  
- Learning is easiest for these students when they can readily connect each new concept or relationship with a mental or physical model (e.g., a schematic drawing) of the situation. At younger ages, these students learn most readily when the concepts described in textbooks and other media have previously been experienced concretely and can subsequently be applied concretely. |

| Building on Strength | Instructional opportunities to build on students’ strength in nonverbal reasoning include the following:  
- For young students, provide reading texts that contain detailed illustrations, especially for unfamiliar content for which the students cannot form their own mental model.  
- In all areas of the curriculum, but especially in science and mathematics, use metaphors, analogies, and real-world examples to help students connect unfamiliar, abstract concepts to more familiar objects or experiences. Such relationships not only enable students to understand but also greatly facilitate retention and transfer.  
- When material is presented verbally at a rapid or inflexible rate, allow students to control the rate at which the information is presented (such as pausing and replaying a video presentation).  
- Encourage students to create drawings when solving problems in mathematics, concept maps when taking notes, or mental models of a scene when reading a text. For young students especially, ask, “What do you see?” and allow them to describe a mental picture. Ask older students to illustrate the scene.  
- Provide a hands-on approach to learning. Relate student interests to traditional, academic subjects and offer physical applications for problem solving.  
- When teaching writing, encourage these students to try descriptive rather than narrative prose. Provide examples of good descriptive prose. Have them first envision the scene they would like to describe before they attempt to describe it to someone else.  
- Encourage the development and application of these students’ spatial reasoning and thinking abilities. These students are often quite skilled in the visual arts and can excel in trades such as carpentry, landscaping, interior decorating, product design, and computer graphics. |
Adapting Instruction to Shore Up Weaknesses

Ability profiles with a V--, Q--, or N-- indicate a relative weakness on the respective CogAT battery. When a student displays a significantly lower score on one of the three batteries, it typically indicates a preference for thinking in one cognitive domain (verbal, quantitative, or nonverbal) rather than another.

Profiles that show an extreme (E) weakness are most common for students with a median age stanine of 9. Indeed, for students with a median age stanine of 9, profiles that show a significant or extreme weakness are almost as common as relatively flat (A) profiles. This is one reason why the CogAT author discourages use of the overall CogAT composite score to identify academically talented students.

The information that follows offers suggestions on adapting instruction to shore up a weakness indicated by a student’s CogAT ability profile.

<table>
<thead>
<tr>
<th>Relative Weakness</th>
<th>Cognitive Domain</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>V--</td>
<td>Verbal</td>
<td>30</td>
</tr>
<tr>
<td>Q--</td>
<td>Quantitative</td>
<td>32</td>
</tr>
<tr>
<td>N--</td>
<td>Nonverbal</td>
<td>33</td>
</tr>
</tbody>
</table>

Relative Weakness in Verbal Reasoning (V--)

<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner Characteristics</td>
<td>These students prefer nonverbal (visual) or quantitative reasoning and often find it difficult to translate their thoughts into words. Over time, this propensity causes a lag in their development of verbal abilities of all sorts, including the ability to reason with words. Verbal skills are so critically important for school learning, however, that these students must be encouraged to develop and use their speaking, reading, and listening abilities. Students with this profile often have lower scores on achievement tests than would be expected on the basis of their median age stanine. Students who exhibit relatively poor verbal skills often do so because they do not routinely participate in conversations that involve formal language structures or meaningful dialogues.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relative Weakness</th>
<th>Indicators of a relative weakness in verbal reasoning include the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Activities that are unnecessarily verbal thwart the students’ performance even in areas in which they excel. Common sources of difficulty are directions that are overly long and tests that require the translation of verbal prompts or that require verbal responses.</td>
</tr>
<tr>
<td></td>
<td>• Students with lower verbal scores (stanines 1–4) often find themselves overwhelmed in the classroom, especially when following directions for the first time or when attempting to transfer their attention between different verbal activities. For example, this situation can occur when students are required to view a rapidly paced video presentation and take notes at the same time.</td>
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Continued on next page...
**Relative Weakness in Verbal Reasoning (V–), continued**

<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
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</thead>
</table>
| **Shoring Up the Weakness** | The critical importance of verbal reasoning abilities for success in school requires that relatively more effort be expended improving these abilities than would be expended to improve a relative weakness in quantitative or, especially, nonverbal reasoning. Suggestions for adapting instruction for these students include the following:  
- To improve performance and reduce frustration, reduce the demands placed on verbal working memory. For example:  
  - Do not expect these students to keep in mind a verbal statement and apply it at the same time. Allow the student to use a prompt, such as a written statement of the concept or strategy needed for the work at hand.  
  - Offload monitoring to another student by having students work in pairs.  
  - Allow many opportunities to practice a new strategy in diverse contexts.  
  - Help students who scored at lower stanine levels to identify the conditions that cue possible use of a new reasoning strategy. Then try to arrange for such conditions to occur unpredictably. The goal is for students to learn to call up and use different procedures as circumstances demand and not rely on fixed strategies in all cases.  
- To improve students’ verbal reasoning abilities, provide exposure to individuals who model hoped-for styles of verbal discourse and verbal reasoning as well as opportunities to engage in conversations in which they practice these speech patterns.  
- Offer a broad language curriculum that combines reading, writing, and speaking as well as opportunities to practice and receive feedback on each. Keep in mind that at all levels, language-related reasoning begins with the oral and external; only after much practice does a reasoning strategy become internalized and automatic.  
- Acquaint students with unfamiliar ways of conversing and writing by providing opportunities to imitate the speaking and writing styles of individuals they admire. Drama, poetry, and storytelling are particularly useful in this regard. After students practice the language forms and syntactic structures orally, they can more readily apply them in written essays and stories.  
- Provide reading assignments and follow-up discussions or activities designed to build verbal comprehension. |
<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learner Characteristics</strong></td>
<td>When compared with students who have an even (A) profile across all three batteries, students who display a relative weakness in quantitative reasoning tend to score somewhat lower across all portions of standardized achievement tests, especially at the primary level. The difference is largest on the mathematics, computation, and language tests. A relative weakness in quantitative reasoning abilities generally has a broader impact on the achievement of students than does a relative strength in quantitative reasoning. The connection between lower achievement on the computation and language tests could reflect a common difficulty in learning rule-based systems, or it could reflect a lack of instruction in both areas. Only someone familiar with the students and the educational curricula they have experienced can make this judgment. There are many causes of a relative weakness in quantitative reasoning. Some students have difficulty creating, retaining, and manipulating symbolic representations of all sorts. For some students, this problem seems confined to numerals; for others, however, it stems from a more fundamental difficulty in thinking with abstract, as opposed to concrete, concepts. For example, even the most elementary concepts in mathematics are abstractions. When counting objects, students must recognize that the number 3 in “3 oranges” means the same thing as the number 3 in “3 automobiles.”</td>
</tr>
</tbody>
</table>
| **Relative Weakness** | Indicators of a relative weakness in quantitative reasoning include the following:  
- Some students prefer more concrete modes of thinking and often disguise their failure to think abstractly when using verbal concepts. For example, a student may use the word *dog* appropriately but may think only about her or his dog when using the word.  
- For other students, the difficulty lies in the failure to develop an internal mental model that functions as a number line. For these students, solving even basic computations such as adding 2 to a given number is a challenge. When performing computations, such students often make substantial errors that they do not detect unless prompted—and even then they may not notice the errors.  
- And for other students, the weakness represents nothing more than a lack of experience in thinking and talking about quantitative concepts. This is fairly common in the primary grades. It surfaces again at the secondary level among those who avoid mathematics. At the middle school and high school levels, math anxiety can also be a significant issue. |
| **Shoring Up the Weakness** | Remediating a weakness in quantitative reasoning requires an understanding of the source of the deficit. Select strategies from the following list that seem most appropriate for the student and the learning situation:  
- If students have difficulty reasoning abstractly, help them focus on the quantitative aspects of a stimulus while ignoring more compelling perceptual features (as in the previous example of 3 oranges/3 automobiles). |

*Continued on next page...*
**Relative Weakness in Quantitative Reasoning (Q−), continued**

<table>
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<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
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</thead>
</table>
| **Shoring Up the Weakness, continued** | • If students have not established or cannot readily use a mental model for representing numeric quantities, give them practice in drawing a number line and then trying to envision and use a mental number line to solve basic addition and subtraction problems. It will take a substantial amount of practice before they can automatically conceive and use a mental number line to solve problems.  
• If the difficulty is a lack of experience or the presence of anxiety, provide greater structure, reduce or eliminate competition, reduce time pressures, and allow students greater choice in the problems they solve. Experiencing success will gradually reduce anxiety; experiencing failure will cause it to spike to new highs.  
• Help these students discover how to use their better-developed verbal and spatial reasoning abilities for solving mathematical problems. At all grades, but especially in middle school and high school, encourage these students to develop the habit of restating mathematical expressions in words. Encourage them to talk about mathematical concepts rather than silently solving problems on work sheets or computer screens. When learning computation skills, they can recite mathematical facts orally and in groups.  
• Provide opportunities for these students to exploit their stronger spatial reasoning abilities by encouraging them to create drawings that represent essential aspects of a problem. Show them how drawings can range from concrete depictions of the objects described in the problem to increasingly abstract representations that capture only the essential aspects of the problem.  
• Encourage students to use computers and other tools to offload lower-level computation processes and to focus instead on higher-level concepts. This is often best done using graphic representations of geometric and algebraic concepts. |

**Relative Weakness in Nonverbal Reasoning (N−)**

<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
</tr>
</thead>
</table>
| **Learner Characteristics** | The implications of a relative weakness in nonverbal reasoning are best understood by comparing achievement test scores for such students with the scores of students who have similar levels of verbal and quantitative reasoning abilities but no deficit in nonverbal reasoning. At the primary and elementary levels, students with a relative weakness in nonverbal reasoning tend to have lower scores on standardized achievement tests in the areas of reading and mathematics. At the secondary level, the deficit is largest in the area of science.  
At all levels, but especially at the primary and secondary levels, these students also have lower composite scores on the achievement test. A weakness in nonverbal reasoning ability has more noticeable and negative consequences for achievement for average-ability students than for students who score in the high (stanines 7–8) or very high (stanine 9) range on CogAT. |

*Continued on next page...*
### Relative Weakness in Nonverbal Reasoning (N–), continued

<table>
<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
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</thead>
<tbody>
<tr>
<td><strong>Relative Weakness</strong></td>
<td>As with a relative strength in nonverbal reasoning, there are two explanations for a relative weakness in nonverbal reasoning: Either the student has difficulty reasoning with figural-spatial stimuli or the student has difficulty solving unfamiliar problems. Before adapting instruction for these students, try to identify the source or cause of their deficit. Consider the following possibilities:</td>
</tr>
<tr>
<td></td>
<td>• For most students, the N– pattern is caused by difficulty with figural-spatial stimuli. Fortunately for them, high levels of spatial reasoning abilities are not required for success in conventionally structured schools. In fact, a relative strength in nonverbal reasoning is often more of a hindrance for students who obtain above-average scores on CogAT. Moderate levels of spatial reasoning abilities are required for success in school, however. Students with weak spatial reasoning abilities encounter difficulties in many areas of the curriculum, especially science and mathematics.</td>
</tr>
<tr>
<td></td>
<td>• Sometimes the N– pattern indicates a difficulty solving problems unlike those encountered in school rather than a relative weakness in spatial reasoning. If this is the case, you are likely to notice a systematic decline in performance as the student moves from school-like tasks to unfamiliar tasks. Support for this interpretation may come from observations of the student’s study habits and anxiety level. Difficulty in solving novel problems is suggested when the student works diligently, even obsessively, at school tasks. Such students often become anxious when placed in situations that lack clear guidelines on what they are expected to do or how they will be evaluated. Performance declines are also notable in test results. For example, in the verbal domain, the student performs best on the Iowa Assessments Language test, somewhat lower on the Iowa Assessments Reading tests, lower still on the CogAT Verbal Battery, and lowest on the CogAT Nonverbal Battery. A similar progression would be apparent in the quantitative domain.</td>
</tr>
</tbody>
</table>

| **Shoring Up the Weakness** | Remediating a weakness in nonverbal reasoning requires an understanding of the source of the deficit. Select strategies that seem most appropriate for the student and the learning situation. Spatial reasoning abilities can improve with instruction. Educational planning for students with N– ability profiles should include training in the specific types of spatial thinking required by the curriculum. Start with concrete objects and physical models of concepts used in the curriculum. Then teach students to draw the model from memory. In teaching geography, for example, have students view a map of western Europe and then draw it from memory, revising the drawing after additional looks at the map. The act of drawing the map from memory will result in greater retention of the images than having students merely view the map without any drawing. |

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Relative Weakness in Nonverbal Reasoning (N−), continued

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<thead>
<tr>
<th>Research-based Principle</th>
<th>Guidelines for Adapting Instruction</th>
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</thead>
<tbody>
<tr>
<td>Shoring Up the Weakness, continued</td>
<td>In many learning situations, however, it will be easier for the students if instruction compensates for, or scaffolds, their poor spatial reasoning abilities. When working with these students, watch for signs that they do not understand because they cannot envision the situation or create a model to represent it. Use instructional strategies and methods such as the following:</td>
</tr>
<tr>
<td></td>
<td>• Replace the question “Do you see…?” with the more informative “What do you see?”</td>
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<tr>
<td></td>
<td>• Provide simple drawings that encapsulate the essential features of the visual mental model required by the problem. Then give students time to examine the drawing and to label it or coordinate it with the text.</td>
</tr>
<tr>
<td></td>
<td>• When possible, do not require the students to shift their attention between two different locations, such as a drawing displayed on the board or LCD projector and a description of the problem in a textbook or workbook. Place the text and drawing in view together or allow students to study the drawing while you read the problem aloud or explain it to them rather than requiring students to read the text themselves.</td>
</tr>
<tr>
<td></td>
<td>• Avoid problems that require transformation of images such as imagining how the drawing would appear from another perspective or following a dynamic transformation. Use computer graphics or physical models to display such transformations. This can be especially helpful in mathematics.</td>
</tr>
<tr>
<td></td>
<td>• Allow students to inspect and physically manipulate objects if necessary.</td>
</tr>
<tr>
<td></td>
<td>• In writing, encourage these students to write narratives rather than descriptions.</td>
</tr>
<tr>
<td></td>
<td>• When teaching strategies, summarize them in short verbal statements that can be rehearsed and committed to memory. When practicing strategies, encourage these students to repeat (aloud) the statements as they perform each step.</td>
</tr>
<tr>
<td></td>
<td>• In mathematics, emphasize strategies that can be summarized verbally. Offload the need for students to visualize by providing drawings, using computer graphics, or having students work in groups in which a partner performs this part of the task.</td>
</tr>
</tbody>
</table>

If, on the other hand, the N− score pattern seems to reflect a difficulty solving problems unlike those encountered in school rather than a relative weakness in spatial reasoning, a different strategy is called for.

• Provide gentle encouragement to engage the students in discovery learning. A student’s problem-solving skills need to be stretched to apply to increasingly unfamiliar, usually less-structured situations. Stretch gently; such students can be overwhelmed if the task demands too much insight, creativity, or transfer, or if they perceive criticism rather than encouragement in the feedback they receive.

• Encourage and reward small steps away from familiar tasks toward tasks that are less familiar and increasingly less structured. This approach gives students practice in assembling and reassembling strategies to solve new problems. It also helps students develop a willingness to attempt the unfamiliar, which is equally important.
Adapting Instruction for Mixed Ability Profiles

C Profiles Explained

C profiles show a significant contrast between the student’s highest and lowest battery scores. The general pattern for C profiles is one high score (a relative strength), one middle score, and one low score (a relative weakness). Sometimes all three scores differ significantly from one another.

In a CogAT report that graphs a student’s battery scores, scores that differ significantly have confidence bands that do not overlap. If the bands around two scores overlap, those scores do not differ significantly from one another.

In the example below, Verbal and Quantitative scores differ significantly. For this student, Quantitative is a relative strength and Verbal is a relative weakness.

<table>
<thead>
<tr>
<th>STUDENT NAME</th>
<th>Birth Date: Level</th>
<th>Age</th>
<th>Form</th>
<th>No. of Items</th>
<th>No. of All.</th>
<th>Raw Score</th>
<th>US$</th>
<th>AGE SCORES</th>
<th>GRADE SCORES</th>
<th>LOCAL SCORES</th>
<th>Ability Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gambozi, Olivia</td>
<td>09/04/95 F</td>
<td>16</td>
<td>J</td>
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<td></td>
<td>183</td>
<td>99</td>
<td>48</td>
<td>5</td>
</tr>
</tbody>
</table>

Achievement Test Performance

The achievement test scores of students who have C profiles generally fall midway between the scores for the two corresponding B profiles. For example, students with the ability profile 4C (V+ Q–) show achievement levels that are approximately midway between those shown by the students with 4B (V+) and 4B (Q–) profiles. This means that the consequences for achievement test scores for students with C profiles are smaller and less easily summarized than those for students with B profiles.

Adapting Instruction for Students with Mixed Ability Profiles

Students with C (mixed) ability profiles are the most challenging to assist with planned interventions. This challenge occurs because it is often difficult to know when particular instructional methods or materials will capitalize on the students’ strengths or, instead, compensate for their weaknesses. For example, students who have difficulty creating and reasoning with mental models often perform much better if given a concrete model or a line drawing to work with when attempting to understand a problem. If the model or graphic is too complex, however, encoding it requires spatial reasoning that may exceed a student’s capabilities.

The line between compensation for a weakness and capitalization on a strength is, therefore, often difficult to discern in advance. These effects differ among students depending on the complexity of the model, a given student’s familiarity with it, and the level of each student’s spatial or figural reasoning abilities.

When a student has both a relative strength and a relative weakness, as in a C profile, it becomes very difficult to know how a given intervention will be perceived and processed by the student. Plan a strategy based on your knowledge of the student’s learning preferences and challenges and your experience with the curricular materials.
Ultimately, the learners’ ease and success as they try to navigate their way through a lesson, a unit, and, eventually, a course help you determine whether a strategy is working as planned. Therefore, although all learners should be encouraged to develop strategies for regulating their own learning, such self-monitoring and self-reflection are particularly important for students with mixed patterns of cognitive strengths and weaknesses.

Help these students understand that the process of learning, using, and then evaluating different strategies is similar to the process of trying on different articles of clothing to see how they fit. Explain that, like clothing, the strategy that fits best now may change as they mature or as the context varies.
COMMUNICATING
RESULTS To
Parents & Students
In Brief

This part of the guide offers suggestions on communicating CogAT test results to students and their families. The following topics are covered:

- “Preparing to Report Test Results to Others”
  - General Reporting Strategies
  - Common Test Score Misconceptions
- “Discussing Test Results with Students”
- “Discussing Test Results with Parents”

Preparing to Report Test Results to Others

Before You Begin

To help ensure that you are working with the best information possible, take the following steps before you plan your reporting strategies:

- Study the reports, the scores, and this guide to learn what is being reported.
- Determine how to communicate test results in the context of the purpose for testing and the individual student.

General Reporting Strategies

The best way to report test scores to students and parents is individually in a face-to-face conference. An individual conference provides an opportunity to clarify the purpose for the test and what the scores mean for that student.

The following guidelines can help make communications about test results more effective:

- **Use simple, everyday language.** Do not assume that parents and primary caregivers are familiar with the specialized terms used in educational testing.

- **Use visual displays to describe performance.** Bar graphs like those provided in the Individual Profile Narrative report are helpful tools for presenting numerical information.

- **Engage in a dialogue.** Encourage students and parents to ask questions about the tests, the scores, and any other concerns they have regarding the test results.

- **Anticipate and address common misunderstandings about test results.** Prepare by reviewing “Common Test Score Misconceptions” below to understand common misconceptions about CogAT results. Correct any misunderstandings that you anticipate or hear during discussions with students and their families.

If your school does not have the resources to hold individual conferences, use the student’s Individual Profile Narrative report to communicate test results. Offer to answer questions about the report and arrange a conference with parents who request one.
**Common Test Score Misconceptions**

Misconceptions about test scores can lead to misunderstandings about student abilities and, in turn, to misguided subsequent actions. Your own understanding of these misconceptions will help you to effectively communicate test results to others and to recognize and correct misunderstandings during those discussions.

Following are some **common fallacies** about test scores and **explanations** to correct each misconception:

- **Percentile rank (PR) means the same thing as percent correct.** People who equate percentile ranks with percent-correct scores may interpret a PR of 60 or below as a failing score. Explain that the concepts of passing and failing do not apply to standardized tests of general cognitive skills and that a PR of 60 means the student scored higher than 60 percent of students in a particular reference group (either nationally for age and grade norms or within the school/district for local norms).

- **The test scores are precise and absolutely accurate.** Test scores are always estimates rather than exact measures. It is important to think of them as representing a range of ability rather than as a specific, unchanging point on a score scale. The confidence bands on the graph of each student’s scores can be helpful in explaining this concept, especially if the student’s responses were inconsistent.

- **The norm group consists of students in a particular classroom or school.** Norms should always be identified when reporting standardized test scores. For CogAT, norms are based on a nationally representative group of students. For age norms, the norm group is made up of students in the nationally representative group who were the same age as the student taking the test. For grade norms, the norm group consists of students in the nationally representative group who were in the same grade as the student taking the test.

  If your CogAT reports also show scores based on local norms, understand their purpose and why those scores may differ significantly from scores based on national norms.

- **General cognitive ability is the only factor that is important in school achievement.** General cognitive ability affects how rapidly students learn, the conditions under which they learn most effectively, and how much they learn. Differences in levels of cognitive abilities do explain a significant amount of the variation in achievement among students. However, many other factors matter as well: support at home, quality of instruction, motivation, out-of-school activities, and so on.
• **CogAT standard age scores (SAS) are IQ scores.** *CogAT* is not an IQ test. Intelligence tests differ from *CogAT* in two critical ways: 1) intelligence tests sample a broad range of abilities in addition to the reasoning abilities that *CogAT* measures and 2) intelligence tests are normed on the entire population whereas *CogAT* is normed on that subset of students who attend school and can take a group-administered test. Because of the potential confusion with IQ tests, score reports shared with parents should give national (and perhaps local) percentile ranks—not standard age scores.

• **CogAT scores should remain the same as the student matures.** *CogAT* does not measure fixed abilities. On average, the year-to-year stability of scores is quite good, although even highly correlated scores have room for individual variability. Composite standard age scores (SAS) for most students change less than 5 points from one year to the next. For 10 percent of the students, however, their standard age scores will change more than 10 points. Young students and those with extreme scores are more likely to have score changes than are high school students or those with an SAS near 100.

• **CogAT measures—or ought to measure—the innate potential or capacity of the student.** Explain that all abilities are developed, and give an analogy to physical skills to explain how this is so. The knowledge and skills that students learn in school and that are assessed by achievement tests are like students’ acquired skills in playing various sports. The general reasoning abilities measured by *CogAT* are like general physical fitness. General fitness is important for success in a wide variety of sports. Using *CogAT* to predict achievement test scores is like predicting how well individuals can probably play a range of different sports given their level of physical fitness. But physical fitness is also, in part, an outcome of participation in physically demanding exercise. Similarly, the verbal, quantitative, and nonverbal reasoning abilities measured by *CogAT* are developed through participation in challenging learning activities.

• **Standardized tests are biased against minorities.** Explain that every item has been screened for potential bias by the test author and publisher and by a diverse panel of minority educators. Items are tried out on thousands of students nationwide and subjected to extensive statistical analyses for bias. All items selected for the test have been reviewed for bias and content sensitivity toward gender.

Most questions about bias on a test such as *CogAT* stem from the assumption that a good test measures abilities independent of culture, motivation, and experience. In another analogy to physical skills, this is like asking for a measure of physical fitness that is not influenced by the physical activities in which a person has participated. Although tests vary in the extent to which they are rooted in culture and experience, all tests measure developed abilities. *CogAT* measures those reasoning abilities that are required by and developed through formal schooling.

Explain that the Verbal Battery at Levels 5/6–8 measures the ability to reason with verbal concepts expressed in pictures and, on one subtest.
The Nonverbal and Quantitative batteries are particularly helpful in estimating the reasoning abilities of ELL these students. At all levels, ELL students actually perform as well or better on the CogAT Quantitative Battery as on the CogAT Nonverbal Battery.

**Discussing Test Results with Students**

Adapt your strategy and message to the developmental level of the student. Consider the suggestions summarized below.

<table>
<thead>
<tr>
<th>Student Grade Level</th>
<th>Considerations</th>
<th>Discussion Strategy</th>
</tr>
</thead>
</table>
| Kindergarten, Grades 1 and 2 | • Students may not recall taking the test.  
• It is unlikely that students in these grades will understand the meaning of the test scores. | No formal discussion about test results |
| Grades 3–5 | Students are capable of understanding scores in a very general way. | • Emphasize verbal rather than numerical descriptions of their performance.  
• Identify particular strengths. |
| Grades 6–12 | • Students are capable of understanding and are interested in test results.  
• Students may be making educational choices regarding elective courses and post-secondary school goals. | • Present results in numerical and descriptive form.  
• If reporting achievement test results along with CogAT results, use the same types of age and grade scores during the discussion, if possible.  
• If percentiles or stanines were reported for the achievement test, use these score types when discussing CogAT results. |

At all levels, the primary purpose for reporting scores to students is to help them understand:

- their own patterns of achievement and general cognitive skills
- the extent to which they are using their cognitive resources

Foster understanding with a dialogue that allows students the opportunity to:

- ask questions
- explain the reasons for their test performance
- express concerns about their scores
- articulate and explore their learning styles, preferences, and interests
Discussing Test Results with Parents

The most effective way to discuss test results with parents or guardians is in a face-to-face conference. The primary goal is to help parents understand how their student learns so that they can work with the school to facilitate the student’s development. If possible, provide parents with their own copy of the student’s Individual Profile Narrative report.

If you are reporting on standardized achievement test results at the same time as CogAT, the following discussion points may be helpful:

- Explain that the two tests appraise different things. The achievement test appraises skills that are directly taught and practiced in school, whereas CogAT appraises general thinking skills that the student gradually develops from both in-school and out-of-school experiences.
- Explain that all test scores are estimates, not absolute measures, of a student’s standing on skills such as verbal reasoning and mathematical computation. Scores on both types of tests change significantly over time.
- Use the same types of scores, if possible, to report results for both tests. Percentile ranks and stanines are easier to explain to parents than standard age scores, which may be confused with IQ scores.
- Discuss test scores and what they mean using verbal descriptions (such as very high, above average, or below average) more often than numerical values. Explain that all test scores contain a margin of error, so one should not attach too much significance to small differences in scores. Use stanines or percentile ranks, not standard age scores.
- Point out relationships between the two sets of scores. If results vary significantly (see “Part 5: Identifying Ability-Achievement Discrepancies,” beginning on page 51), probe causes such as learning styles, motivation, and possibly language/educational background in an effort to partner with the parents on solutions for improvement. If both sets of results are relatively poor, focus on the tests with the highest scores and strategize how to build on relative strengths.

Parent-Teacher Discussion Topics

This section contains a list of topics to consider when discussing a student’s CogAT test results with parents or a primary caregiver. Typically, it is best to begin by explaining what CogAT measures and why it was given. Use the Individual Profile Narrative report in discussing the first four items on this list. The remaining items are questions that parents commonly ask. Focus on topics relevant to the student and be prepared to answer questions that arise during your parent-teacher discussion.

- **What does CogAT assess?** CogAT measures general thinking and problem-solving skills and indicates how well the student uses these skills to solve verbal, quantitative, and nonverbal problems. The profile of these abilities helps teachers better understand how different students learn best. The skills measured by CogAT develop gradually throughout a person’s lifetime, but individuals vary in the rates at which they develop the skills. Experiences both in and out of school influence their development.
• **Why was the test given?** Based on your school’s purpose for administering CogAT, indicate why the information from the test is important and how it will be used. Explain that the scores will be used to help the students learn more effectively. If there are additional reasons relevant to the student under discussion, state these as well.

• **What is the student’s relative standing on each battery and the composite?** Include descriptive information about where the student stands in her or his age and grade groups as well as whether the individual’s pattern of abilities is even or uneven. If uneven, identify the strengths and weaknesses in the profile. If the student’s relative standings in the age and grade groups differ, point out the differences. If they are significant, explain how the age of the student in relation to her or his grade peers influences the differences and what they mean. (For information on the effect of a student’s age on CogAT results, read about “Age Norms” and “Grade Norms” beginning on page 109.)

• **What is the purpose of the ability profile?** The ability profile assists teachers and counselors in locating specific instructional suggestions for helping the student learn based on the student’s CogAT scores. The ability profile summarizes information about the level and pattern in each student’s scores for the three batteries. As students change, so will their ability profiles.

• **What is the basis of comparison for these test scores?** In reporting relative standing, be sure to make clear that the student is being compared with a national representative sample of her or his age and grade peers. Sometimes parents think this comparison is based solely on the students who are in the same class. If local norms are also used, explain their use and significance.

• **What is my child’s IQ?** Explain that the type of score known as an “IQ” is no longer used in large-scale assessments and that CogAT does not give IQ scores. Emphasize that CogAT measures developed reasoning abilities that grow with activities in and out of school that challenge students to reason about their experiences. If this explanation is not sufficient, explain that, unlike specialized IQ tests, CogAT is normed only on that portion of the population that attends school and can take a group-administered test.

• **Is my child gifted?** State that there are many types of giftedness and that scores on CogAT are related to one type, namely, academic giftedness. Explain that giftedness in any area depends on many factors and that all of these cannot be determined by a single test. Further, students who excel in the primary grades often do not achieve such high rankings compared with classmates as they mature. The “gifted” label implies a permanence that often misleads. If the school has a program for academically talented students, answer this question in terms of the eligibility criteria for that program. Encourage parents to focus on the development of their child’s interests and talents, not on whether the student is or is not gifted.

• **What do the CogAT scores indicate about the student’s ability to learn?** If the student has below-average or very low scores on CogAT, explain that all individuals can learn, but they do not all learn at the same rate or in the same way. Emphasize any strengths the student displays. Discuss what is being done in school to help this individual learn. If the student has average or higher scores on CogAT and is doing very
poorly in school, explore possible reasons for the discrepancy and discuss what can be done both by the school and by the parents to help the student.

- **How can CogAT scores predict achievement in school?** Explain that predicted achievement levels reflect how students in the national sample who obtained similar scores on CogAT performed in school. Use broad ranges, such as above average or average, to designate the level of achievement. Indicate that these expected levels of achievement should be viewed as only one guideline for setting expectations of the student’s progress in school. If parents indicate concern about their child’s predicted level of achievement, address these concerns and be certain that parents understand what predicted achievement means. It should not be viewed as a permanent consignment to a particular level of achievement. Point out that factors such as effort, attention, attitudes, work habits, and support at home also influence school achievement.

- **How does the student’s classroom performance compare with that of the predicted score?** Indicate whether the student’s achievement in class is the same as, higher than, or lower than predicted. Explain how well the student uses her or his cognitive resources as well as other resources to learn. If the student’s achievement is higher than predicted, comment favorably on it. If the achievement is lower than predicted, explore with parents the possible reasons and the steps that could be taken to improve it.

- **Why are scores on CogAT and an achievement test different?** Sometimes this question indicates that the parent is placing undue emphasis on small, insignificant differences between scores. For example, if a student has a percentile rank of 85 on the Verbal Battery and a percentile rank of 80 on the Reading section of a standardized achievement test (e.g., the Iowa Assessments), the difference is insignificant. Remind parents that the two tests measure different things, so scores should not be expected to be identical. Point out that although the two scores are not identical, they are consistent because (in this example) both indicate that the student is above average. Note that very high (or low) scores on one test are unlikely to be as high (or low) on the other test.

- **How can teachers, counselors, and parents work together to help the student become a more effective learner?** Discuss ways that parents can capitalize on their child’s strengths while supervising homework, helping their child practice skills, or providing enrichment experiences. Some parents can use the suggestions for adapting instruction that are provided online for each CogAT ability profile. If there are community or school resources that would benefit the student, discuss available resources with parents.
Achievement Discrepancies
In Brief

Are students underachieving, overachieving, or performing in line with their abilities? Results from the Cognitive Abilities Test (CogAT) provide a measure by which to identify ability-achievement discrepancies.

This part of the guide explains the following actions:

- Use CogAT results to identify ability-achievement discrepancies.
- Follow a process to identify likely explanations for ability-achievement discrepancies.
- Interpret and act on these discrepancies.

The flowchart at the right illustrates the process for taking action after identifying that a discrepancy exists.

Using CogAT to Identify Ability-Achievement Discrepancies

The Relationship between Ability and Achievement Test Scores

Interpreting discrepancies between reported and predicted achievement requires a fundamental understanding of what achievement and ability tests measure.

**Ability tests** (e.g., CogAT) measure learned reasoning abilities. Reasoning abilities are developed indirectly through instruction as well as through a wider range of experiences.

Although tests measure different aspects of developed abilities, reasoning abilities are good predictors of academic achievement.

**Achievement tests** (e.g., the MAP test or MCA test) aim to measure knowledge and skills explicitly taught in the schools.

The following analogy helps to explain the relationship between ability and achievement.

Picture a physician’s height-and-weight chart. Height and weight are different aspects of physical development, just as school achievement and reasoning abilities are different aspects of cognitive development.

Increases in height do not, in and of themselves, cause corresponding increases in weight; similarly, increases in reasoning abilities do not cause increases in achievement. In other words, lower-than-
expected achievement scores do not necessarily mean that a student is “not living up to his or her potential.”

**Making Ability-Achievement Comparisons**

The graphic below illustrates two starting points for identifying discrepancies between ability and achievement. Both starting points involve using *CogAT* results to form a preliminary conclusion about a student’s performance.

The rest of this section of the guide explains how to use both of these methods to identify ability-achievement discrepancies.

**Comparing CogAT Scores and Observed Classroom Performance**

If you work with students on a regular basis, you probably make intuitive estimates of their abilities. Students’ curiosity, ease in learning, quiz results, state achievement scores, report card grades, work samples, and other evidence observed in the classroom help you form estimates of their abilities.

Comparing *CogAT* results with your own intuitive estimates is one way to identify discrepancies between measured ability levels and students’ performance in the classroom.

**To identify discrepancies using this method of comparison, follow these steps:**

1. Form an estimate of ability based on your observations of a student’s performance. Mentally rank his or her performance as above average, average, or below average.
2. Locate the student’s composite SAS on a *CogAT* score report.
3. Compare your ability estimate with these composite SAS ranges:

<table>
<thead>
<tr>
<th>Your Ability Estimate</th>
<th>Composite SAS Range</th>
<th>Composite Age Stanine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well above average</td>
<td>120 or higher</td>
<td>8–9</td>
</tr>
<tr>
<td>Average</td>
<td>89–111</td>
<td>4–6</td>
</tr>
<tr>
<td>Far below average</td>
<td>80 or lower</td>
<td>1–2</td>
</tr>
</tbody>
</table>

**Note:** Performance and even personality differences distinguish students who are well above average and those far below average.
4. What are your findings?

<table>
<thead>
<tr>
<th>Discrepancy</th>
<th>Traditional Explanation</th>
<th>Possible Alternative Explanations/ CogAT Score Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predicted achievement exceeds observed achievement –</td>
<td>Most likely a result of poor effort or poor</td>
<td>Students are particularly good at solving novel problems. Their ability to transfer verbal and/or quantitative knowledge</td>
</tr>
<tr>
<td>“Underachievement”</td>
<td>schooling</td>
<td>and skills acquired in school is better than expected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If this is the case, scores on the CogAT Verbal Battery and/or Quantitative Battery are likely to be higher than scores on the Nonverbal Battery.</td>
</tr>
<tr>
<td>Observed achievement exceeds predicted achievement –</td>
<td>Most likely a result of good effort or good</td>
<td>Students do well on tasks that were taught but not as well on unfamiliar tasks. Their ability to transfer verbal and/or quantitative knowledge and skills is limited.</td>
</tr>
<tr>
<td>“Overachievement”</td>
<td>schooling</td>
<td>If this is the case, scores on the CogAT Verbal Battery and/or Quantitative Battery are likely to be lower than scores on the Nonverbal Battery.</td>
</tr>
</tbody>
</table>

**Next Steps**

The benefit of identifying discrepancies between ability and achievement scores is to alert you to situations that warrant further investigation.

The next topic explains considerations for students with flagged score discrepancies as well as for those who have no discrepant scores.

**Interpreting Discrepancies and Taking Action**

When CogAT scores and observed achievement (either classroom performance or Iowa Assessments results) differ significantly, further investigation is warranted.

**Comparing Observed and Predicted Achievement**

The table below compares traditional explanations for discrepancies between observed and predicted achievement with alternative explanations derived from CogAT scores.

**Interpreting Discrepancies between Observed and Predicted Achievement**

**Underachievement**

Students whose CogAT scores exceed observed achievement are much better at solving unfamiliar problems than at solving the sorts of tasks more typically studied in school. Traditional explanations of underachievement might suggest the following:

- The student has not applied himself or herself with sufficient diligence to school learning.
- The student has not had appropriate opportunities to develop the types of knowledge and skills common to classroom instruction and achievement tests.
But the score pattern could also mean that the student is particularly good at transferring his or her learning to unfamiliar, unpracticed contexts.

To determine which interpretation is most likely for a particular student, review his or her CogAT battery scores rather than the composite score.

<table>
<thead>
<tr>
<th>If you find...</th>
<th>Then this suggests...</th>
</tr>
</thead>
<tbody>
<tr>
<td>A relative strength on the Nonverbal Battery (indicated by (N^+) in the ability profile)</td>
<td>The “underachievement” interpretation is plausible. Discrepancies between observed and predicted achievement based on the nonverbal score are generally greater and more reliable than predictions based on the verbal or quantitative scores.</td>
</tr>
<tr>
<td>A relative strength on either the Verbal ((V^+)) Battery or the Quantitative ((Q^+)) Battery</td>
<td>The student may have adopted a learning style that emphasizes memorization of content and skills. The student relies more on these low-level skills than on meaning-making and meaning-finding, which would make better use of his or her reasoning abilities. Encourage the student to search for ways in which new knowledge and skills connect to other knowledge and skills, especially in other domains. Then describe these connections. For example, say “This is like what we learned earlier this year (or in another class).” Based on the student’s scores, refer to relevant portions of “Part 3: Adapting Instruction to Students’ Needs and Abilities,” beginning on page 11.</td>
</tr>
</tbody>
</table>

Although clues offered by the CogAT ability profile can be helpful, interpretation of discrepancies between ability and achievement test scores ultimately depends on the simultaneous consideration of many factors, such as opportunity to learn, motivation to learn, temperament, and the presence of specific physical and learning disabilities.

**Overachievement**

When observed achievement exceeds predicted achievement, traditional explanations might suggest the following:

- Such students have applied themselves well to school tasks and have acquired higher levels of knowledge and skills than one would predict, given the level of their reasoning abilities.
- The students’ problem-solving strategies are relatively context bound.

Whether because of restrictions imposed by experience or by temperament, students who have not learned to stretch their school learning beyond practiced contexts show this pattern of relatively higher scores on achievement tests and conventional classroom measurement tools than would be predicted from their scores on CogAT.

Once again, examination of the student’s ability profile across the three CogAT batteries can help you make an appropriate interpretation.
<table>
<thead>
<tr>
<th>If you find…</th>
<th>Then this suggests…</th>
</tr>
</thead>
<tbody>
<tr>
<td>A relative weakness on the Nonverbal Battery (indicated by N– in the ability profile)</td>
<td>An interpretation that emphasizes unusually good effort and schooling</td>
</tr>
<tr>
<td>A relative weakness on either the Verbal (V–) Battery or the Quantitative (Q–) Battery</td>
<td>A need for greater flexibility and transfer in school learning</td>
</tr>
</tbody>
</table>

**Expected Levels of Achievement**

On reports showing results from both the *Iowa Assessments* and *CogAT*, the default is to flag scores if observed achievement is in the top or bottom 10 percent of the distribution of achievement scores at a given ability level. (Your school system may have selected a larger or smaller range, however.) After identifying students with such score discrepancies, do not ignore the students whose scores were not flagged. In particular, do not assume that students whose scores are not flagged are “doing about as well as can be expected.”

Consider once again the analogy to height and weight. Just because a certain weight is not unusual for a certain height does not mean that both are not unusual in some respects. For example, a child whose physical development lags behind that of his or her peers frequently weighs less and is shorter than his or her age-mates.

Look for instances in which observed and predicted achievement test results are aligned but unusually high or low for the student’s age or grade level.

**Taking Action**

All abilities are developed through experience and exercise. Students who show large extremes in either direction (higher achievement than ability or higher ability than achievement) have important imbalances in their cognitive development that merit closer scrutiny. Comparing *CogAT* and *Iowa Assessments* scores allows you to conduct a closer evaluation at the *Iowa Assessments* subtest level.

See “Part 3: Adapting Instruction to Students’ Needs and Abilities,” beginning on page 11, for suggestions based on the *CogAT* results for any student.
Measuring Cognitive Development to Help Identify Academically Talented Students

In Brief

Using CogAT as a measure of cognitive development provides you with a more complete picture of students’ abilities across the spectrum of academic achievement. CogAT Form 7 is the result of extensive revision of Form 6; the test continues to provide critical information on the cognitive strengths and weaknesses of an increasingly diverse student population.

Assuming you have a talent identification and development program in place, this part of the guide serves two purposes:

- It summarizes selection-process principles commonly recognized as good practices in talent identification.
- It explains how to use CogAT results to help identify academically talented students.

Identifying Academically Talented Students

Many schools establish special academic programs to provide challenging learning environments for students who are exceptional for their age in learning, problem solving, and achievement. CogAT can provide unique information to assist in the identification of such students.

Selection-Process Principles

Some general principles apply to the selection process:

- Consider framing the decision in terms of talent identification and development rather than deciding whether a student is or is not gifted. This approach is especially helpful when the goal is to increase the diversity of students served by the program.

- When defining the manner in which CogAT scores will be used for selection, consider the types of educational services offered. For example, if your school offers only single-subject enrichment, you will review scores differently than if your school provides whole-grade acceleration only.

- Use multiple measures in the selection process and combine them appropriately. In addition to CogAT, include measures of achievement and self-evaluation or teacher ratings of interests and motivation.

- Use the information in all three CogAT scores, not merely the overall composite score. Expect that many talented students will show a significant or even substantial relative weakness on one test battery.

- Consider using multiple perspectives—national age norms, national grade norms, local norms, and within-group ranks—when interpreting scores.
National versus Local Norms in Talent Identification

Norms make it possible to make data-based statements about students’ relative strengths or weaknesses.

Advantages of National Norms

National norms compare the scores of your test-takers with a common standard defined by the performance of a representative national sample of students of the same age or in the same grade. When you administer the test to a new class of students, national norms provide a well-developed standard that allows you to see variation in the abilities of students being considered for talent development programs.

Advantages of Local Norms

The primary limitation of national norms is that they do not take into account local variations in ability or achievement. Policies that require all students in a school system or state to attain the same level of excellence on a nationally normed test can be problematic: such criteria result in some schools without any students served by a talent development program and other schools in which a substantial portion of the student population is labeled “gifted.”

The need for special instructional or academic programming at the local level depends on the discrepancy between a student’s current level of cognitive or academic development and that of his or her classmates—not that of all other students in the nation. Local norms serve this purpose.

Local norms are created from the distribution of standard age scores for a particular group (e.g., school or school system) that are scored at the same time. Standard age scores use the power of national norms to control for the effects of age. If all students tested were in the same grade and tested at approximately the same time, then the effects of grade are also controlled.

Local norms typically represent the performance of only a particular sample of students for the year in which the test is administered. Schools can update local norms by appending test scores for each new group of students to the file of scores of previously tested students. This is easily done in any spreadsheet.

Other Considerations in Identifying Academically Talented Students

Accounting for Differences in Background and Experience

Inferences about an individual student’s intellectual ability from test scores, classroom activities, projects, and other behavioral evidence are judgments based on observing student behavior given individual opportunities to learn. More-able individuals learn in a few trials what less-able individuals require many trials to learn. However, if for any reason a student’s learning opportunities have differed markedly from those of students of the same age or in the same grade, these normative comparisons based on age or grade will underestimate or overestimate the student’s ability to learn. For example, the intellectual abilities of students who live in poverty, who have had irregular or poor schooling, or who have little or no experience with the language of instruction (or testing) can be underestimated when their behavior is compared with that of all other students of the same age or in the same grade.
The challenge, then, in selecting students for talent development programs is to account for major differences in opportunity to learn. There are two ways to do this:

- To the extent possible, avoid aspects of a test (e.g., language) that disadvantage some students when measuring abilities.
- Compare the student’s test scores with the scores of other students who have had roughly similar opportunities.

CogAT is designed to allow both ways of controlling for opportunity to learn. For example, the test is designed to reduce or eliminate the impact of language on the test itself. When the Sentence Completion subtest is excluded for ELL students, none of the subtests at Levels 5/6–8 use items that require language. The CogAT Form 7 Verbal and Quantitative batteries are even more effective in this respect than the Nonverbal Battery. At the upper levels, none of the items on the Quantitative and Nonverbal batteries use language. The ready availability of practice materials can also help level the playing field.

You can also make better inferences about talent by comparing a student’s score with the scores of other students (typically of the same age) who have had similar opportunities to learn. This is especially helpful in controlling for differences that are moderated by economic opportunity, but it can also be helpful for understanding the abilities of ELL students.

Removing the demands for language reduces but does not eliminate developmental inequities that stem from large differences in culture or economic opportunity. Therefore, even when using non-language tests like the CogAT Levels 5/6–8 batteries or the quantitative-nonverbal (QN) partial composite, it is often still necessary to take into account the student’s opportunity to learn. CogAT data analysis and reporting tools are designed to facilitate the process.
Estimating Opportunity to Learn (OTL)

If your school used supplemental coding on CogAT answer documents, determine whether that coding identifies these two aspects of a student’s OTL:

- English language learner (ELL) status – Use of the ELL option in the supplemental coding Programs section identifies students classified as English language learners. Additional customized coding can differentiate levels of English-language ability.

- Economic status – The school’s most accessible measure of family income is whether a student qualifies for free or reduced-price lunch (F/RL). The F/RL option in the Programs section indicates a student’s eligibility in this program.

By using supplemental coding to group students with one or more measures of OTL, you can order score reports that separate and rank students within the different OTL groups. Alternatively, you can use DataManager™ to separate and sort scores or export data to a spreadsheet and perform similar analyses there (details in Lohman, 2011; see “Other Resources” on page 50).

Considerations in Talent Identification Using Within-OTL Scores

One objection to using local norms or within-group ranks is that such scores are less dependable than scores based on national norms. However, the need for precise estimates of ability is a direct consequence of trying to determine whether a student is truly “gifted.” If the goal is to identify talented ELL or economically disadvantaged students who might profit from special encouragement, projects, or enrichment, there is no need for such precision.

One of the major stumbling blocks for effective talent identification among OTL students is the presumption that all talented students must receive the same kind of special instruction. In athletics, we would expect that some students with no experience swimming might have talent for the sport. But we would not expect them to immediately begin swimming at the same pace as students with many years of practice in the sport. In this example, we recognize that the inference of talent is distinguishable from a judgment about the current level of development of that talent. Similarly, identifying talent within OTL groups must be coordinated with the design of programs to serve those identified. In considering how to do this, keep in mind that encouraging interest and persistence in the pursuit of excellence is as important for talent development as the acquisition of academic knowledge and skills.

Further, unlike classmates whose parents or guardians may have greater resources, students from economically deprived households often must rely on schools to provide special services and opportunities for talent development. In many cases, some form of enrichment (rather than single-subject or whole-grade acceleration) may be most appropriate for many of these students since their academic development often will be similar to that of their regular classmates, especially in domains that require high levels of competence in the English language.
Multiple Selection Criteria

Selection Considerations

Many schools use multiple criteria to identify academically talented students. Rating scales, creativity tests, teacher ratings, and other sources of information can be helpful, but program coordinators must combine the various sources of evidence in some way.

Even when raters are well trained, ratings they provide are usually much less reliable and valid than CogAT scores. As a result, even assigning ratings a lesser weight in selection can be problematic. For example, when program resources are limited, every student who gains admission because of high ratings or creativity scores prevents the admission of a student with lower ratings but high ability and achievement scores. An effective way to overcome this dilemma is to use ratings (and other measures that are potentially less reliable and valid than CogAT) to provide opportunity but never to remove it.