Over the past few decades, there has been an increasing concern that educational assessment provides little support for classroom learning. Some people question the value of traditional summative assessments used in schools, and fear that teachers lack high-quality formative assessments that target core skills in their curriculum. This problem motivates researchers and educators to investigate best practices for using assessment to inform instruction and learning. One such effort is the Cognitively Based Assessment of, for, and as Learning (CBAL™) research initiative, which draws upon curriculum standards and learning sciences research. The CBAL initiative aims to build a model for an innovative K–12 assessment system that documents what students have achieved (of learning); helps identify how to plan instruction (for learning); and is considered by students and teachers to be a worthwhile educational experience in and of itself (as learning) (Bennett, 2010). In this article, we will show how learning progressions — describing how students’ skills develop over time — can support teaching and assessments. We begin by giving a brief overview of research on learning progressions under the CBAL project, in order to demonstrate how test performance supports inferences about student competency. We proceed to illustrate the theoretical framework using argumentation learning progressions and present assessment items designed to measure the skills addressed by the progressions.

**Learning progression**: In the CBAL research initiative, a learning progression is defined as a description of qualitative change in a student’s level of sophistication for a key concept, process, strategy, practice, or habit of mind.

**Common Core State Standards (CCSS)**: A set of curricular goals in English language arts and mathematics adopted by most states for students in grades K–12.

**Component task**: A task that targets a specific skill in the learning progressions.

**Scenario-based task**: A set of activities that integrate reading, writing, and critical thinking within a storyline.

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**CBAL™ Learning Progressions**
How do you know when a student is ready to take the next step in learning new skills? This is one of the key questions educators face in their daily work. Introducing a skill or concept too early will likely result in frustration and a failure to learn. Spending time on a skill or concept that the student already understands will likely result in boredom and disengagement. It is therefore crucial to know where a student stands on his or her path towards mastery, but finding that out is not a simple task. One potential solution to this problem, which has received increased attention in educational research, is the application of learning progressions.

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1 Editor’s note: Yi Song, Associate Research Scientist; Paul Deane, Principal Research Scientist; and Edith Aurora Graf, Research Scientist, work in the Research & Development division at ETS. Peter van Rijn is a Research Scientist for ETS Global BV.
The term “learning progression” was first introduced to describe possible levels in student development of a specific skill or concept in the context of science assessment (e.g., see Corcoran, Mosher, & Rogat, 2009, p. 37), but is now also applied to other domains. Thus, it is not surprising that the definitions of learning progressions held by researchers vary slightly. In the CBAL project, a learning progression is defined as a description of qualitative change in a student’s level of sophistication for a key concept, process, strategy, practice, or habit of mind (see CBAL Wiki at http://elalp.cbalwiki.ets.org/Outline+of+Provisional+Learning+Progressions).

Learning progressions can inform both assessment and instruction by making the expected developmental sequence explicit. Unlike the Common Core State Standards (CCSS), which focus on defining grade-level expectations, the CBAL learning progressions emphasize qualitative shifts in performance that indicate when students are ready to move on regardless of grade. In other words, learning progressions support the design of assessment tasks intended to measure student qualitative achievement levels. The assessment results can then be used to recommend classroom activities that can help students proceed to the next qualitative level. Each progression is presumed to be modal — that is, to hold for most, but not all, students. The CBAL learning progressions for English language arts (ELA) are provisional models, subject to empirical verification and theoretical challenge.

There are more than 40 ELA learning progressions within the CBAL project, covering major skills in reading and writing activities. To illustrate our research approach, we will focus on four learning progressions tied to argumentation, which is an important research strand under the CBAL project. Argumentation skills are critical both in the classroom and in the real world. Students must learn to state their own positions, evaluate arguments, and respond to different perspectives if they are to become successful professionals and members of a democratic society. Argumentation is emphasized in the CCSS for English (Council of Chief State School Officers & National Governors Association, 2010), but it is a skill that many students currently lack, which leaves them ill-prepared for college and careers. We know from research that students find it challenging both to interpret arguments in a text (Chambliss, 1995; Larson, Britt, & Larson, 2004) and to produce their own arguments in writing (Ferretti, MacArthur, & Dowdy, 2000; National Center for Education Statistics, 2008; Persky, Daane, & Jin, 2003). We also know that traditional instruction covers the basics of composition (e.g., writing a five-paragraph essay), but places little emphasis on argumentation and its related critical thinking skills (Hillocks, 2002). In particular, argumentation is a complex and challenging skill to teach.

To support instruction and learning about argumentation, the CBAL project creates new forms of assessment that go beyond traditional summative assessment. Our development approach is based on evidence-centered design (ECD; Mislevy, Steinberg, & Almond, 2003), a method that maps how test performance supports inferences about student competency. We drew upon curriculum standards and learning sciences

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2 A teacher needs to deal with only a subset of the progressions related to what he or she is teaching in a given grade or grade span.
research to develop a competency model that defines the major skills needed in argumentative reading and writing activities. Then we developed *argументation learning progressions* that help measure the level of argumentation skills students have reached and to support teachers as they guide their students to higher levels of performance. Each level of these progressions is keyed to relevant classroom activities that help students develop their argumentation skills.

**Argumentation Learning Progressions**

Argumentation is a dialogue in which participants can take different positions and change their minds as it proceeds. In order to successfully engage in such a dialogue, participants should normally go through five phases in an argumentation cycle (see Figure 1). These five phases are outlined below.

1) **Understand the stakes:** To make effective appeals in an argument, students must understand the stakes, which involves thinking about the context and the target audience.

2) **Explore the subject:** To have a meaningful conversation about a topic, students must understand it. Shallow knowledge leads to ineffective argumentation.

3) **Consider positions:** To play a role in an argumentative dialogue, students must take a position and consider the positions others have presented.

4) **Create and evaluate arguments:** To defend a position, students must present plausible reasons and evidence and address counterarguments. They should also evaluate the arguments to identify unwarranted assumptions that could undermine the logic.

5) **Organize and present arguments:** To join the discussion, a student must frame his or her own case, and consider how to structure and present each argument.

The actual process of building an argument is flexible and fluid. People can start anywhere in the argumentation cycle and proceed in any direction between parts of the process. They may even repeat steps when needed.

Each of these phases draws upon a different set of skills that requires separate learning progressions. The argumentation learning progressions are aligned with four of the five phases given in Figure 1:¹

1) Appeal Building (understanding the stakes)

2) Taking a Position (considering positions)

3) Reasons and Evidence (creating and evaluating arguments)

4) Framing a Case (organizing and presenting arguments)

¹ Exploring the subject is aligned with the inquiry learning progression, which is considered a more general literacy skill that is used across genres.
Each of these skills has its own progression through five developmental levels (see Table 1):

- **Preliminary** (expected by pre-K to second grade)
- **Foundational** (expected by upper elementary)
- **Basic** (expected by middle school)
- **Intermediate** (expected by high school)
- **Advanced** (mastered in college or graduate school)

Grade information reflects a general sense of what is considered developmentally appropriate for students at different points in their school careers, but it does not tie specific learning progression levels to particular grade levels, since students’ skills and prior knowledge may vary widely. It is possible for a high school student to be working at a preliminary level with challenging material, or for a strong fourth-grade student to be tackling basic-level tasks with material he or she knows well.

The qualitative shifts in the CBAL argumentation learning progressions correspond to the developmental milestones in argumentation skills suggested by researchers. Consider the **Reasons and Evidence** learning progression in Table 1. Researchers have found that most students can state an opinion and offer at least one reason for it at a fairly early age (e.g., McCann, 1989). Logically, this skill should be placed at the preliminary level. At the next level (i.e., foundational), we specify that students can elaborate their reasons and start to understand evidence, which is based on empirical findings that students begin to elaborate and provide details in support of their arguments as they reach the upper-elementary grades (Ferretti et al., 2000; Ferretti, Lewis, & Andrews-Weckerly, 2009). Subsequently, we expect that students’
understanding and use of evidence become relatively mature at the basic level. In contrast, some skills could be challenging to students and might not develop before adulthood unless instruction or scaffolding is provided. For example, students find it difficult to analyze the assumptions behind their arguments even when they have reached middle or high school (Kuhn, 1991), and it is rare for students of any age to present arguments from both sides of an issue in their writing (Kuhn & Crowell, 2011; Kuhn & Udell, 2003). Refuting opposing viewpoints presents an even greater challenge (Ferretti et al., 2000; Knudson, 1992; Leitão, 2003; Nussbaum & Kardash, 2005). These skills are placed at the intermediate or advanced level in the Reasons and Evidence learning progression. As shown in Table 1, students only gradually develop full control over all elements of a well-structured argument, which generally reflects the developmental trends identified by research.

Because they are hypotheses, the argumentation learning progressions must be carefully validated. Thus far, we have done an extensive literature review, conducted an initial empirical study, and consulted four external experts in the field of teaching argument-related skills. These outside experts agreed with the main focus of each progression, but also raised some issues, including:

- the importance of describing changes in what students know about argumentation, not just in what they can do when confronted with an argument;
- the importance of introducing counterargument and critique from the earliest stages of instruction; and
- the social nature of argumentation, and the importance for instruction of treating argumentation as a dialogue between people with different perspectives.

We have integrated each of these concerns into the current version of the learning progressions.
Table 1. Overview of Argumentation Learning Progressions

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<tr>
<td></td>
<td>Appeal Building</td>
<td>Taking a Position</td>
<td>Reasons and Evidence</td>
</tr>
<tr>
<td>Preliminary</td>
<td>Understands the idea of trying to convince someone by making some sort of persuasive appeal</td>
<td>Understands the idea of taking a side in an argument and accepting or rejecting another person's statements as true or false based on how well one thinks it fits the facts</td>
<td>Understands the idea that positions may need to be supported with reasons that will be convincing to the audience</td>
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<tr>
<td>Foundational</td>
<td>Transfers the idea of making a persuasive appeal into a written context and does some simple analysis of how oneself or an author might appeal or has appealed to different audiences and interests</td>
<td>Understands and expresses positions in writing with reasonable attention to what one knows and some ability to focus on what is important in the domain</td>
<td>Recognizes, generates, and elaborates on reasons in writing, with some awareness of the need for evidence, and uses one's own arguments to counter others' arguments in an engaging, familiar context</td>
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<tr>
<td>Basic</td>
<td>Infers rhetorical structure in texts, and builds rhetorical plans of one's own that coordinate multiple appeals and rhetorical moves into a coherent effort to persuade a target audience</td>
<td>Understands and expresses positions clearly, capturing their relationships to similar and contrasting points of view</td>
<td>Understands use of evidence and clearly grasps the need to provide evidence and reasons that are directly relevant to and support the main point and which are logically sound</td>
</tr>
<tr>
<td>Intermediate</td>
<td>Shows flexibility in interpreting and developing rhetorical plans, with sensitivity to differences among audiences with different points of view</td>
<td>Successfully analyzes unstated assumptions, biases, and other subjective elements in a text and can use that to develop one's own position more clearly</td>
<td>Understands the role of critique and rebuttal and is able to reason about and respond to counter-evidence and critical questions</td>
</tr>
<tr>
<td>Advanced</td>
<td>Displays a well-developed rhetorical (metacognitive) understanding of persuasion</td>
<td>Can use others' arguments to develop one's own understanding and then frame one's own position in terms that exploit the current &quot;state of discussion&quot;</td>
<td>Builds systematic mental models of entire debates, and use that model to frame one's own attempts to build knowledge</td>
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Applying Argumentation Learning Progressions to Assessment Design

When designing assessments, we want to elicit evidence of the level of understanding that students have reached. We are therefore using argumentation learning progressions as a framework for assessment development. This section will not only provide examples of component tasks (i.e., tasks that target specific skills identified in the learning progressions) aligned to the Reasons and Evidence learning progression, but will also show a scenario-based task set that integrates reading, writing, and thinking related to argumentation.

Component Tasks

We have developed multiple sets of component tasks for each targeted skill in the argumentation learning progressions to capture sufficient evidence about the levels of student skills in argumentation. To illustrate, this section includes sample items for Reasons and Evidence, and each item is designed to measure a skill at a specific level in this progression. The following preliminary-level item (Reason-1-E) measures a student’s ability to generate individual reasons to support a specific point, in sentence form. It asks students to write one reason for celebrating birthdays in the classroom and one reason against it. Students are only expected to give simple responses, like “Birthday parties make kids feel happy and appreciated” or “Kids might get competitive about bringing in the best birthday cake.”

Reason-1-E

When students reach the foundational level, they can generate multiple reasons to support a position and embed those reasons in a paragraph-length position statement. This skill is what we try to assess in the next item (Reason-2-E), which asks students to write a paragraph to address the issue of whether or not parents should pay their children for doing chores at home. Students are expected not only to
express their position, but also to explain their supporting reasons. In contrast to the preliminary level, we expect students to develop multiple arguments and elaborate to a greater degree.

**Reason-2-E**

At the basic level, students should demonstrate skills in building logical, hierarchically structured arguments. The following two screen shots display an item (Reason-3-E) that assesses the targeted skill. Students first read some background information about the metric system as well as a fact sheet and then decide their position on the issue of whether or not the United States should switch to the metric system. They should use the given information as evidence and then arrange reasons and evidence to support main and subsidiary points. Obviously, this task involves a more complicated skill than what the foundational level requires.
At the intermediate level of the *Reasons and Evidence* learning progression, students should be able to write simple critiques or rebuttals to other people’s arguments. To measure this skill, we have developed specific tasks that require students to...
critically evaluate others’ arguments. The next item (Reason-4-E) is a good illustration. Specifically, students are asked to write a critique of Redman’s argument about the author of Shakespeare’s work — that is, to identify reasoning flaws in the argument. We normally give students information (e.g., a fact sheet in Reason-4-E) about the topic or issue under discussion, which allows us to focus on their ability in using evidence to evaluate arguments.

**Reason-4-E**

The advanced level requires students to demonstrate their full mastery in creating and evaluating arguments. They should be able to write extended discussions and critiques that place arguments in the larger context or discourse. The tasks therefore normally involve reading multiple articles and conducting research to understand current issues. In addition, students should show how their arguments contribute to the ongoing discourse. For example, one task asks students to propose a policy for using computers in the classroom and to explain how their policy addresses the research findings on multitasking and learning outcomes that are described in the given articles.

Component tasks allow teachers to identify specific skills with which a student has difficulty. For instance, is a student challenged by using evidence (tested by a basic-level item) or by writing a debatable and focused thesis statement (tested by a foundational-level item)? Does a student fail to interpret arguments in a text (reading skills), to express her own arguments (writing skills), or to use appropriate strategies to analyze arguments (critical thinking skills)? If a student easily identifies major

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*The screen shot does not show all the text by Marco Redman. When the item is administered online, students can scroll down the bar to read the full text. In addition, they can click the menu “Factsheet” to check information.*
reasons in an article, but struggles with creating her own arguments, the teacher could brainstorm reasons with her and model ways to introduce reasons in an essay. Hence, component tasks, if used in combination with learning progressions, can support classroom instruction purposefully.

Scenario-Based Tasks

A second important strand of assessment development focuses on scenario-based tasks that integrate reading, writing, and critical thinking within a storyline. Though component tasks try to separate these modes for certain purposes, they are not independent, but support one another and draw upon many of the same underlying activities (e.g., Deane, 2011; Hayes & Flower, 1980; Newell, Beach, Smith, & Van Der Heide, 2011). For example, a reader may have to evaluate someone else’s argument. When the reader switches roles and starts writing a response, he or she will have to formulate new arguments and think critically about how other people will evaluate them.

One of the scenario-based assessment sets, namely CBAL Junk Food (a scenario about whether or not junk food should be sold in school), is designed to assess a group of argumentation skills through four tasks, the last of which calls for the integration of those skills. In the first task, students read short articles about the issue of banning junk food in school and summarize their major arguments. The second task asks students to organize people’s statements by deciding which side each statement supports and to evaluate whether a piece of evidence supports or weakens a particular claim. In the third task, students critique arguments in a letter to the editor. They are expected to identify and explain problems in the reasoning or use of evidence. Finally, students write a persuasive essay for their local newspaper to express their opinion on the junk food issue. We have mapped each task to a particular level of an argumentation learning progression, which supports useful inferences about students’ performance.

Junk Food Scenario
The scenario-based task design on the previous page has two important features. First, it can help address a common problem in writing assessments — i.e., that students tend to write in a vacuum and hence are ill-prepared to make arguments of their own. After reading articles and analyzing people’s arguments about junk food, students are likely to have a better understanding of the issue and have more meaningful arguments in their essays. For instance, they can use information in the articles as evidence to support their arguments rather than making things up.

Another important feature in our task design is the scaffolding elements embedded in an assessment. For example, in the summary task for the Junk Food assessment, students are initially given a few suggestions for how to write a good summary of someone else’s argument. Then they read sample summaries and evaluate whether these summaries make good use of the suggestions. Finally, they are asked to identify problems in each summary. Once they have been introduced to the characteristics of a good summary, students are required to write summaries of their own. This process provides scaffolding to students who otherwise might not have been able to complete the task. It also provides students with a set of standards for quality work that we want them and their teachers to internalize, to make a habit of mind. Teachers can integrate such tasks into their curriculum, deciding when and how they would like to use our formative materials based on what levels their students have reached.

Conclusion

The ability to present and evaluate arguments is an essential skill for advanced academic work in many fields and for a variety of professions (Graff, 2003). Specifically, the Common Core State Standards put an emphasis on writing logical arguments, requiring that students demonstrate sound reasoning and use relevant evidence (Council of Chief State School Officers & National Governors Association, 2010). In this article, we used argumentation learning progressions to demonstrate how our approach guides assessment development and informs instruction. We described how one aspect of argumentation skills develops through five hypothetical levels and showed the items and tasks for collecting evidence about a student’s performance level. Initial empirical data on scenario-based task sets have recovered a sequence of levels as we envisioned (Graf & van Rijn, 2012), and we will continue conducting studies to evaluate the progressions. Our materials (e.g., learning progressions, handbooks, scenario-based assessment sets, and component tasks), some of which have been illustrated in this paper, can be used in flexible ways to suit teachers’ instructional purposes and to meet students’ learning needs.

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