Formative Assessment for the Common Core Literacy Standards

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Background/Context: As implementation of the Common Core Literacy Standards moves ahead, teachers, students, and schools are discovering that the standards demand a great deal of them in order to achieve the vision of college, career, and citizenship in the global-digital world outlined in the standards. To accomplish the goals and high expectations set forth in the Literacy Standards, teachers confront fundamental changes in their curricular, instructional, and assessment practices.

Purpose/Objective/Research Question/Focus of Study: This article presents a working model of the formative assessment process that we think will be essential for effective implementation of the standards. Assessment for learning rather than testing of achievement is presented as a way of guiding teachers and students through the progressions needed to college and career-readiness. The paper is organized around four points: (1) the distinctive features of the model, (2) the match between the model and the vision of the standards, (3) a description of the inquiry process that serves as the “engine” for the model, and (4) an account of the Herman-Heritage cycle-time/grain-size concept that supports ongoing management of formative assessment. The model is designed to be embedded in the project-based activities called for in the standards as students conduct short- and long-term research across the disciplines.

Research Design: This article presents the results of a careful and comprehensive reading of the Common Core Literacy Standards. A focused review of the literature on formative assessment serves as the foundation for the working model presented here.

Conclusions/Recommendations: The conceptual ideas and practical tools discussed in this article point to the need for substantial and sustained professional development, both preservice and inservice, to support the fundamental changes entailed by the standards. To foster the deep understandings called for by the standards, teachers will require an equally deep understanding of formative assessment as a process in which inquiry is embedded in instruction to monitor learning, provide feedback, and shape students learning as it is taking place.

Over the eight years that Achieve has been surveying the states on their commitment to college and career readiness, states have transformed their aspirations for all students to graduate from high school prepared for postsecondary success into action. A focus on getting the standards, standards implementation, and assessments right has laid the foundation for the change that state leaders have long committed to: ensuring that students—all students—have access to a K-12 education that prepares graduates for college, careers, and citizenship.

states must have assessments that reflect the full range and depth of their standards. They need assessments that can ask students to do something with their knowledge — to research, to explain how or why, to actually think and learn in the process of taking a test. They need assessments that give students a chance to solve multistep problems, write essays grounded in text, explain their answers and construct arguments, which means the tests should be delivered online. And assessments must tell parents and students if they are on track for graduating ready for college and careers. To meet these needs, states must have assessments that move far past the fill-in-the-bubble, end-of-the-year tests most states have been giving. In short, they need next generation assessments. (Achieve, 2013, pp. 3-4, emphases added).

This excerpt from Achieve's 2013 report paints a grand picture of the Common Core Literacy Standards (“Standards”) (NGA/CCSSO, 2010; Note 1), including an urgent call to “get the Standards, the Standards implementation, and the assessments right.” The prescriptions for assessment in the second paragraph seem “right” on target, especially the penultimate sentence: “assessments must move far past the fill-in-the-bubble (selected-response), end-of-year tests.” Meeting this challenge calls for a program of formative assessment. In this paper we offer a plan for handling this task.

The Literacy Standards ask a great deal of students, teachers, and schools. Students must learn to wrestle with genuine problems, drawing upon the academic disciplines to create presentations that demonstrate their accomplishments. Educators must organize these tasks around clusters of standards, which means that students work on really big projects. By high school, students will have the responsibility for shaping and defining these projects. To ensure that all students meet the standards, learning must be continuously monitored to ensure that students receive adequate feedback and guidance along the way. Monitoring, feedback, and guidance call for formative assessment, the focus of this paper. The
driving force behind all of these endeavors is a vision from the standards in which all high school graduates are “college- and career-ready,” fully prepared as citizens for the global-digital world that lies ahead (Zhao, 2012).

Implementing this vision will entail fundamental changes in curriculum, instruction, assessment, and the professional role of teachers. Ensuring that all students meet these high expectations will require a shift from “grading” to “growing.” Summative tests grade student achievement at the end of instruction; formative assessments grow student learning as it is happening, while the “clay is wet,” and while it is possible to take action to enhance learning (Glaser, 1990). Formative assessment is a relatively new idea, but the time is right for building a working model; the standards provide both opportunity and necessity for taking on this task.

The model proposed in this paper builds upon the work of many individuals and groups. Especially pertinent are conclusions from the Report of the Gordon Commission on The Future of Assessment in Education (Gordon, 2013):

- The Common Core Standards call for assessment of high-level skills and knowledge, of critical thinking and logical reasoning, of subject matter mastery, and of broad-based transfer of learning;
- The major function of assessment in education should be to inform and improve teaching and learning . . . ;
- Through differentiated systems of assessment that are distributed throughout teaching and learning, providing real-time feedback for monitoring and adaptation of instruction . . . ;
- To ensure that the assessment strategies take into account the ever-present situational and personal variations, in order to sustain the validity of the evidence.

The Report recommends a shift from measurement of status to documentation of learning. It discusses neither the standards nor the pragmatics of formative assessment, connections that will be made in this paper.

The report does include a paper by Bereiter and Scardamalia (2013; also cf. Bereiter, 2002; Bereiter & Scardamalia, 2005), “To be an Educated Person in the 21st Century,” that is especially useful for our purposes. This essay takes a cognitive perspective on issues directly related to the Literacy Standards. It begins by noting “the limitations of knowledgeability in a knowledge-based society,” a puzzling phrase at first glance. Until the last few decades, knowledge has been a precious commodity, difficult to obtain, a challenge to human memory, and hard to manage. The body of human knowledge has grown and changed, but at a fairly slow pace. Think about books, libraries, encyclopedias, and so on. In an earlier era, educated persons were knowledgeable because they had filled the file drawers of memory with a lot of stuff from the disciplines, the professions, the arts and crafts, and so on. Most people worked with their hands more than their minds.

With the arrival of the digital age, information is more easily accessible, amazingly cheap, and increasing exponentially—welcome to the knowledge-based society! Think Google, Wikipedia, Facebook, LinkedIn, and so on. To be knowledgeable in the 21st century depends not on memorizing but on managing information, on learning how to use digital technology to amplify intellectual resources. Bereiter and Scardamalia (2013) list five competencies essential for success in this new world: (1) knowledge creation and building; (2) the capacity to bridge the abstract and the concrete, the theoretical and the practical; (3) access to systems for grappling with complexity (cf. Simon, 1996), (4) cognitive persistence and resilience, and (5) collective cognitive responsibility.

The introduction to the standards lays out an agenda designed to prepare young people for the knowledge-based world, to become doers and makers, inventors and entrepreneurs (Zhao, 2012), an agenda that closely matches the preceding list. Here is a portrait of schooling under the Literacy Standards:

- Curriculum: Problem-based activities as the platform for supporting an integrated language literacy core; a plan for K-12 experiences that promote effective problem solving and communication while engaging students in our traditions, in the knowledge, experience, and skills that we value, including the disciplines, our cultural heritage, and our diversity. The problems arise from real-world events and experiences like those that make the present such an exciting and challenging time.
- Instruction: Activities that promote and scaffold deep and strategic learning, and that “Teach a few things well” (Mann, 1841). Technology assists teams in collecting information from anywhere and anytime, in organizing the findings, and in preparing dynamic presentations to report the results.
- Assessment: The focus of this paper. Imagine teachers who possess x-ray vision that makes learning visible, supports monitoring, provides feedback, and guides instructional decisions. The teacher serves not as a source of knowledge, but as the orchestrator of student teams engaged in knowledge building and presentation.
- Organization: Under the standards, schools and schooling will be “works in progress,” places of continuous change and renewal, and of professional “re-development,” bringing to life Schaefer’s notion of The School as a Center of Inquiry (1967).

We realize these transformations will take time and effort, and are likely to generate confusions and frustrations. The latter are part of the present picture, reflecting differences in how the standards are perceived and
interpreted. Each component in the preceding list is important in its own right, but the whole promises to be far more than the simple sum of the parts. In this paper we address two questions. First, what do the standards actually say? Second, why and how does formative assessment mesh with the standards?

THE STANDARDS: WHAT DO THEY REALLY SAY?

The Common Core Literacy Standards have the potential to promote fundamental change in our nation’s schools, in large part through a change from objectives-based training to project-based activities. Surveys indicate that relatively few people have read the standards (Bushaw & Lopez, 2013). Local educators—teachers and administrators—are relying on information from the states and on exchanges with one another. In turn, states and districts are following guidelines produced by various national groups, including Achieve, which played a major role in both the standards and the earlier American Diploma Project (Achieve, 2004; also cf. Pennington, Obenchain, Papola, & Kmitta, 2012, who note the alignment of implementation plans with the organizations that drafted the plans). Achieve published an influential set of documents referred to as the “shifts,” short, bulleted lists of high priority outcomes. The first set, “three shifts,” released by Student Achievement Partners (AchieveTheCore, 2011) shortly after the standards appeared:

1. Building knowledge through content-rich nonfiction;
2. Reading, writing, and speaking grounded in evidence from text, both literary and informational;
3. Regular practice with complex text and academic language.

An annotated version is available at AchieveTheCore (also cf. “six shifts” from EngageNY, 2012). These and related documents (e.g., Publishers Criteria, Coleman & Pimentel, 2012) share four features in common. (1) They narrow the focus from literacy to reading, giving limited attention to writing and speaking/listening. (2) They are linked to specific objectives, rather than to larger clusters. For example, close reading (Boyles, 2013; Snow & O’Connor, 2013) is connected to Reading Anchor 1: “Read closely to determine what the text says explicitly and to make logical inferences from it.” Literal comprehension is clearly an important skill, but rather than serving as a starting point for more complex tasks, it has become an end in its own right. (3) The advisories emphasize simple objectives to the neglect of more challenging outcomes. For example, Research to Build and Present Knowledge seems to us a keystone cluster, an outcome that merits substantial attention, but it is not found in any of the advisories. (4) The shifts require modest changes from existing practice. For example, in close reading exercises, teachers are told that reading should focus on the text, and eschew personal experiences and opinions. “Work within the four corners of the text” is the advice. Existing practice begins with an “introduction/background” activity, in which the teacher prompts students to share their reactions to the topic and the context. The resulting discussion can get out of hand, with the result that an entire lesson is caught up in students’ reminiscences. The close-reading “fix” is to delete the entire activity, which many publishers have done, even though research has shown the importance of connecting new learning with what is already known.

The rising chorus of concerns about the standards arises less from anything in the standards than from concerns about the “tests” (Reid, 2014). These are still under development, and no one knows exactly what they will look like, but it appears that they will be tougher, and that test scores will be much lower. The standards actually say nothing about tests or testing. They do mention close reading and text-based evidence, but not as high priority items. The situation is confusing, so let us take a look at what the documents actually say.

The Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects (NGA/CCSSO, 2010, http://www.corestandards.org/ELA-Literacy), despite the lengthy title, is a relatively brief document, only 66 pages. It is not especially easy to understand, partly because it is organized differently than previous state standards. We have found it helpful to divide the document into three parts: (1) the introduction, which lays out the vision of the standards, (2) the Anchor Standards, a set of core expectations that span the K-12 spectrum, and (3) the grade-by-grade standards, which resemble learning progressions (Black, Wilson, & Yao, 2011; Heritage, 2008; Mosher, 2011; Wylie, 2008), and can be interpreted as specific learning objectives if viewed one at a time.

We begin with the introduction, next look at the Anchor Standards, and then the grade-by-grade objectives. For teachers and others eager to get to the bottom line—“What should I do on Monday?”—the introduction can be frustrating. It is not an instruction manual and seems to ramble at times. We are enthusiastic about the message, but it took time and effort to fully comprehend what was being said. It has been worth the effort. The following six statements summarize what the standards have to say:

- The standards are a work in progress;
- The standards offer compelling images of high school graduates from 2020 and beyond;
- The standards recommend project-based learning coupled to the primary disciplines through an integrated literacy program;
- The standards call for an intertwining of curriculum, instruction, and assessment;
- The standards lay out fundamentals and broad goals and are not intended to limit the literacy curriculum; and
- The standards propose that all students can achieve the standards through teacher support and scaffolding.

Each of these bullets has explicit support in the standards (Calfee & Wilson, 2013). For example, the claim that the
standards are “a work in progress” comes from the following statement: “The Standards are intended to be a living work; as new and better evidence emerges, the Standards will be revised accordingly” (p. 3). The document speaks with authority about fundamentals, but is not chiseled in granite. It is not a legal document, but a set of recommendations rather than “demands” as suggested by some (e.g., EngageNY, 2012).

Our claim that the standards call for “project-based activities” is found in the writing cluster, Research to Build and Present Knowledge, which proposes that, during the last two years of high school, students “conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem” (p. 66). The complete specifications for grades 11-12, including related standards in reading, speaking/listening, and language, are quite extensive (cf. pp. 35-66) and will not be presented here, but warrant study.

The introduction is remarkable for the richness with which future graduates are portrayed and for the simplicity of the guidance given to teachers and students for achieving these goals. The connection of literacy with the academic disciplines and “technical subjects” means that students learn to read and write (and speak, listen, think, and communicate) about topics and themes with lifelong value. The introduction claims that students who meet the standards will demonstrate independence, will be sensitive to the demands of audience, task, purpose, and discipline, and will understand other perspectives and cultures. The view of literacy goes beyond basic mechanics to include matters of values and heritage.

The Anchor Standards are an innovation. Each literacy strand (e.g., reading, writing, speaking/listening, language) “...is headed by a set of College and Career Readiness Anchor Standards that is identical [emphasis added] across all grades and content areas” (p. 8). What is the rationale for “identical standards across all grades?” The Anchor Standards provide the foundation for a backward mapping strategy. They were established as critical expectations for all high school graduates (cf. Achieve, 2004); you can find the details laid out for Grades 11 and 12. The same anchors are then moved back through the grades, where the grade-by-grade entries illustrate specific mileposts. At every point, the idea is to keep the final goals in sight. The writers did not intend for educators to start with the grade-by-grade standards, but to look at the package as a whole. The introduction urges practitioners to work with clusters of objectives rather than isolated items; “each separate strand need not be a separate focus for instruction and assessment. Often, several strands can be addressed by a single rich task” (p. 5).

The document also recommends that the more challenging standards should receive higher priority, which seems to be the point of the paragraph titled “research and media skills blend into the Standards as a whole” (p. 4):

...[to be ready for] life in a technological society, students need the ability to gather, comprehend, evaluate, synthesize, and report on information and ideas, to conduct original research in order to answer questions or solve problems, and to analyze and create a high volume and extensive range of print and nonprint texts in media forms old and new. ... Research and media skills and understandings are embedded throughout the Standards rather than treated in a separate section (p. 4).

Support for the priority claim can also be found on Page 33, “staying on topic: How to build knowledge systematically in English Language Arts K-5.” The segment begins:

Building knowledge systematically in English language arts is like giving children various pieces of a puzzle in each grade that, over time, will form one big picture. At a curricular or instructional level, texts—within and across grade levels—need to be selected around topics or themes that systematically develop the knowledge base of students (p. 33).

The quotation refers to English language arts, but the list of trade books is about the biology of the human body. The writers do not say how these books might be transformed into the curriculum, instruction, and assessment necessary for an educational activity, but the intent clearly goes beyond the basics of decoding and comprehension. Nor is the aim to learn about the human body—although that is not a bad idea. Rather, the focus is on the experience of learning to build a knowledge base, to learn what it means to read and write about science, to comprehend and to compose in a way that ensures deep and lasting knowledge about an important topic, and that creates a template for transfer to other areas of science and other disciplines. As an aside, we have found no mention of technical subjects in any of the discussions of the standards. What are these supposed to cover? The standards do not say, but the professions could certainly use some attention: engineering, medicine, business, and so on. We would also nominate the arts and crafts, because they prepare graduates for productive jobs and for entertaining avocations.

We conclude this section with a look at the differences between current practices and what we find in the standards. During the last two decades, schooling has become a bookkeeping enterprise; lists of detailed objectives slotted into scope-and-sequence charts, presented for learning, tested for mastery, and checked off as “covered.” The standards call for a fundamentally different approach, in which learning is a coherent and purposeful endeavor, where problem solving and communication are regular events, and where schooling moves students toward preparation for life beyond school, toward an information society that is global, digital, and “flat.” Here is a set of “big shifts” that captures this vision:

- Integration of language and literacy, and linkage with disciplines;
• Student engagement in “big tasks” and multiple standards;
• Project-based learning activities;
• Authentic student productions and performances; and
• Ongoing formative assessment conducted by teachers and students.

The last item on the list, formative assessment, serves the teacher in guiding and shaping instruction, but it is also a learning outcome for students. As they move through the grades, self-assessment comes into play as a significant feature in preparation for the digital world, as a competence that undergirds independence and reflectivity.

A MODEL OF FORMATIVE ASSESSMENT UNDER THE STANDARDS

We now present a model of formative assessment tailored to the challenges and opportunities of the standards. We believe that the assessment field has reached a point, conceptually and practically, where it is possible to build such a model (Calfee, Wilson, Kapinus & Flannery, in press). Several key ingredients are available: a clear conceptualization of formative assessment, the evolution of learning models for tracking cognitive and conceptual changes, and advances in the pragmatics of embedded assessment. Building the model will pose challenges, and putting the ideas into action, will require significant efforts to “get it right.” But we have a lot to work with.

This section is organized around four questions:

• What are the distinctive features of the proposed model for formative assessment?
• Why is the model a good match with standards-based learning?
• How are formative assessment activities to be conducted; what is the process?
• When are formative assessment activities to be carried out; what is the schedule?

Here is a snapshot of our proposal. Standards-based formative assessment is a multilevel system of ongoing inquiry into student learning, orchestrated by the classroom teacher with increasing student participation. The multiple levels take shape as variations in cycle time and grain size that direct the tasks of observing, guiding, and documenting the flow of instructional activities and student learning paths. Instruction engages students in project-based activities of substantial scope and depth. The teacher’s ongoing inquiry is a form of action research. Cycle-time variations call for the teacher to zoom in and out, from momentary interactions to project-based units, and then to quarterly and end-of-year mileposts. The results are not “measures” but portraits, narratives that document students’ progress over time as they become increasingly expert in problem solving and communicating. The first two questions are conceptual, while the latter two are practical.

WHAT ARE THE FEATURES OF A STANDARDS-BASED MODEL OF FORMATIVE ASSESSMENT?

The roots of formative assessment are found in Scriven’s (1967) distinction between summative and formative program evaluation. Summative evaluations provided the bottom line after development was complete (“How did it turn out?”), while formative evaluations were conducted during development to guide mid-course improvements (“How is it going?”). Bloom, Hastings, and Madaus (1971) later applied the idea to assessment of student achievement. Nitko (1989) made a contrast between internal (decided by the teacher) and or external (mandated by higher authorities) assessments (also cf. Calfee & Hiebert, 1988; Cole, 1988). This work had little effect on classroom practice.

An important advance occurred with Shepard’s (2006) chapter on classroom assessment, which featured formative assessment, highlighting the work of Sadler (1989), “who provided the most widely accepted model of formative assessment. . . . Feedback must be linked explicitly to clear performance standards and strategies for improvement,” (Shepard, 2006, p. 626), and Atkin, Black, and Coffey (2001), who “framed the learning-assessment process around three key questions: (1) Where are you trying to go? (2) Where are you now? (3) How can you get there?” (p. 628). These ideas foreshadow current definitions of formative assessment, which focus on learning rather than status, and on inquiry rather than testing. In a final section, Shepard (2006) noted the need for “new conceptualizations of reliability and validity” (p. 641) in formative assessment.

Advances in formative assessment during the past two decades have appeared under a variety of labels—classroom and informal assessments, interim and benchmark tests, portfolios and performance assessments—and an outpouring of handbooks and volumes (e.g., Andrade & Cizek, 2010; Bailey & Jakicic, 2012; Chappuis, Stiggins, Chappuis, & Arter, 2012; Gardner, 2006; Harp, 2006; Lissitz, 2013; McMillan, 2007; Noyce & Hickey, 2011; Ortleib & Cheek, 2012; Pellegrino, Chudowsky, & Glaser, 2001; Phye, 1993; Popham, 2008, 2010; Wiliam, 2011). Two themes characterize these activities: (1) the purpose of formative assessment is to monitor growth, guide progress, and promote success, and (2) the aim is not to measure status but to help students achieve learning goals.

In 2006, FAST/SCASS (Formative Assessment for Students and Teachers/State Collaborative on Assessment and Student

http://www.tcrecord.org/PrintContent.asp?ContentID=17649
Standards), after two years of work, proposed the following definition of formative assessment:

Formative assessment is a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve student achievement of intended outcomes. (McManus, 2008, p. 3, emphases added)

McManus added several helpful comments:

- “Formative assessment is a process rather than a particular kind of assessment . . . There is no such thing as a ‘formative test’”;
- “The formative assessment process involves both teachers and students . . . , both of whom must be actively involved in the process of improving learning”;
- “Learning progressions provide teachers with the big picture of what students need to learn, along with sufficient detail for planning instruction to meet short-term goals”; and
- “teachers must provide [students] the criteria by which learning will be assessed . . . using readily understood language, and realistic examples of what meets and does not meet the criteria.” (McManus, 2008, p. 3-5)

The FAST/SCASS definition will provide the foundation for the model proposed below (also cf. Wylie, 2008).

A second event, the release of the standards, has also influenced the development of formative assessment, in part because of the establishment of two federally funded assessment consortia, SBAC (Smarter Balanced Assessment Consortium) and PARCC (Partnership for Assessment of Readiness for College and Career; Herman & Linn, 2013). Both groups proposed to balance the summative (for accountability) and formative (to support learning) components. The assumption was that balance meant a more or less equal distribution of resources in developing the two components. Four years down the road, the reality is that work on the year-end summative tests has absorbed the majority of the resources, delaying progress on formative assessment (Heitlin, 2014). The reasons for this situation are understandable; the summative tests are designed around new tasks on new platforms and have received higher priority because they serve for accountability.

Groups and individuals other than the test consortia have also been working on the issues. Some are arguing that formative assessment should play a more significant role, given the demands of the standards. For example, Brookhart’s (2013) analysis led her to conclude that “balance does not mean equal proportions. If the entire assessment system is a way of supporting learning . . . , then most of the assessment information should be where the learning occurs, with students in classrooms” (p. 182). She also called for an end to test-based accountability, because it undermines any activities that are not tested. Teachers (and administrators) cannot serve two masters. They will focus on “assessment FOR learning, [which] starts with learning targets derived from expected outcomes, collects evidence as to where students are, and uses that information to help students make progress . . . [or they will attend to] assessment OF learning to assign grades or certify the level of attainment of the outcomes” (p. 173).

Haertel’s (2013) paper for the Technical Report of the Gordon Commission also emphasizes the importance of formative assessment to foster learning, expresses concerns about summative testing:

- “[in my vision of the future of schooling], classroom assessment will be truly integrated with instruction, based on student pursuits that are educationally useful and intrinsically meaningful in the classroom context. Assessment inferences will be informed by observations of the processes as well as the products of student learning activities. Children will work alone or together on engaging tasks, much of their work supported by various technology-mediated systems. Records of students’ actions will be captured and analyzed to support high-level inferences about their reasoning and expertise.”

- “The Gordon Commission goes beyond earlier appeals [Resnick & Resnick, 1992] in presenting a more sophisticated vision of assessment and assessment use, linked to the transformative power of new digital technologies to bring a more expansive vision of learning outcomes closer to realization . . . . Assessments will show directly what students know or are able to do, not just how they compare to one another.”

- “when assessment is primarily for education rather than of education, objectivity becomes less important. The times are changing . . . We are beginning to understand that we need a contextualist and relativist science as new developments in science, technology, and scientific imagination carry us beyond the limits of our familiar, positivist epistemology . . . the foundational principle of assessment as evidentiary argument linking observations to inferences and actions will endure, but [the evidence and] reasoning will be more complex and more particular to the circumstances of individual students.”

Haertel’s message is that the next generation of assessments should ensure that students have adequate opportunities to demonstrate their individual and collective potential by providing adequate time and other resources needed both to learn and to demonstrate their competence. Teachers should also be allocated the time and resources needed to evaluate
WHY FORMATIVE ASSESSMENT IS A NECESSARY MATCH TO THE STANDARDS.

The standards call for students to engage in project-based activities (e.g., *Research to Build and Present Knowledge* and related clusters) as settings for acquiring literacy while applying disciplinary strategies to authentic problems. Students are assigned big jobs, beginning in kindergarten and reaching a peak in high school. Students are to engage in learning in depth (Alberts, 2012; Egan, 2010) through daily project activities, across a spectrum of problems and disciplines. The projects are not prescribed; the answers are not at the end of the textbook. Start and finish may be defined, but between these two points, student learning paths can take many forms. The size, complexity, richness, and unpredictability of these scenarios pose challenges in tracking learning, hence the need to monitor, provide feedback, and guide learning. Teachers (and, in the later grades, students) must tap into the learning process while learning is taking place.

The project-based activities called for in *Research to Build and Present Knowledge* (and in similar clusters) differ significantly from the specific objectives found in today’s basal readers. Think about a master craftsman (a carpenter, a landscape gardener, an artist, a medical doctor, etc.) who takes on an apprentice. The pool of people who are ready and able to work as an apprentice is probably small. The investment in the apprenticeship is large. The aim is to ensure that the candidate finally attains a high level of expertise from the experience. The apprentice will be immersed in projects under the guidance of the master, who sometimes “teaches by telling,” but more often relies on “learning by doing”; the apprentice works while the master observes and monitors, offering useful feedback, asking questions, and scaffolding as needed. A lot is going on, there is time and opportunity to observe, and the master knows what to look for.

When the Gordon Commission calls for assessments that “inform and improve the processes and outcomes of teaching and learning,” they probably have in mind the “big learnings” associated with the development of expertise under the tutelage of a master craftsman. Such learning is often invisible (Ritchhart, Church, & Morrison, 2011). The outcomes are complex and observation of the processes challenging (Darling-Hammond & Bransford, 2005). Where can we find magical “lenses” that allow us to observe learning as it happens during the complexities of project-based activities? How is the teacher to assess the outcomes, both immediate and long term? How can the teacher see whether the learning will transfer to new situations?

Project-based activities provide a rich and sustained context for looking at learning, along with numerous opportunities to “experiment” with the process. The richness and complexity of the activities means that a great deal is going on; one key is to help students “show their work.” Teachers need to ask authentic questions and think carefully about students’ answers. Monitoring learning is essential for successful implementation of the standards. Research projects are big and complicated, and novice students need the feedback, guidance, and scaffolding that can be provided only when the teacher opens the windows of the mind in order to see what is going on, and to direct and shape learning. More is needed than a status report; the purpose of feedback in this process is to provide guidance and encouragement rather than to record a letter grade (Brookhart, 2008).

The standards will require a transformation in classroom discourse. They call for “Close, attentive reading; wide, deep and thoughtful engagement; cogent reasoning and use of evidence; understanding; transfer; insight; conducting research to build and present knowledge,” all to be brought into action through sustained explorations of significant topics and themes. It is clearly difficult for the teacher to track students’ progress in these situations if he or she is doing most of the talking, or is thinking about what to say next, or is following the IRE (Interrogate, Respond, Evaluate) pattern found in many basal lessons (Cazden, 1988).

HOW SHOULD FORMATIVE ASSESSMENT BE CONDUCTED?

This section and the next offer practical suggestions for standards-based formative assessment. The sections address process questions: how and when. Our response to how has origins in the questions posed by Atkin et al. (2001), which portray formative assessment as a process of teacher inquiry: (1) where are you going; (2) where are you now; (3) how can you get from here to there. Sadler’s (1989) three points are similar: (1) the teacher holds a concept of the standard (the achievement goal), (2) compares the current performance level with the goal, and (3) takes appropriate action to close any gaps (Sadler, 1989, p. 120; 1998; also cf. Calfee & Drum, 1979; Calfee & Hiebert, 1988, 1990, 1991; Calfee & Masuda, 1997; Calfee & Wilson, 2004; Hiebert & Calfee, 1992; Wilson & Calfee, 2012).

In the model proposed here, the teacher is an “action researcher,” monitoring complex events, interpreting various moves, looking for discrepancies, forming hypotheses, and conducting experiments. Figure 1 lays out a seven-stage process that serves in part or whole to describe these activities: (1) identifying and framing a problem or question related to student
behavior, (2) formulating an inquiry plan, (3) collecting evidence related to hypotheses about the situation, (4) analyzing and evaluating the evidence (5) for review and reflection, (6) taking stock and making decisions and taking action, which may mean repeating the inquiry, and (7) remembering to pull together notes and memories to document the outcomes. The figure suggests a sequential flow, but in practice the process is iterative and interactive, at times kaleidoscopic. Initial impressions may change shape based on a closer look. The teacher follows students' meandering learning paths, comparing these to instructional progressions defined by clusters of grade-by-grade standards that serve as learning targets for a particular project. How is a student progressing? What problems and precautions? What specific actions should be considered?

Figure 1. An Inquiry Model for Formative Assessment for Instruction Based on the Common Core Literacy Standards

This model of formative assessment entails a dramatic shift in the teacher’s role, from managing activities and delivering content to orchestrating student work and observing and supporting learning, from following a script to making decisions. Teacher decision making was an active area of research and development in the 1980s and 1990s, but declined at the turn of the century (Anderson, 2003). Current research on the topic is scarce, but there are promising leads. For example, Herman, Osmundson, Ayala, Schneider, and Timms (2006) conducted a well-designed study of teacher decision making based on a formative-assessment model similar to that being proposed. The model was curriculum embedded, and teachers followed the leads—up to a point. They became adept at formulating questions, collecting and interpreting evidence, and reaching conclusions about students’ needs. But then the process stalled; teachers offered little feedback and were unable to formulate and implement instruction decisions. The study does not explain this result, but demonstrates the potential of the model for tracing teachers' progress in learning and implementing the model, and provides guidance for professional development (also cf. Reutzel, Child, Jones, & Clark, 2014, whose analysis of basal reading programs finds little support for key elements of formative assessment).

WHEN SHOULD FORMATIVE ASSESSMENT BE CARRIED OUT?

The idea of incorporating formative assessment in a standards-based program raises practical concerns; teachers may see formative assessment as one more test, to be crammed into a schedule that is already tight. They may have good reasons for this concern. The FAST/SCASS report emphasizes that authentic formative assessment is a process rather than a test, but practitioner magazines and journals are replete with advertisements for formative-assessment test sets.
A brilliant answer to the *when* question is provided by Herman and Heritage (2007; also Heritage, 2013) in the complementary concepts of “cycle time” and “grain size” (Figure CT/GS). Cycle time deals with scheduling issues. When should assessment take place? The answer is, whenever learning is happening, which includes “teachable moments,” “in spurts,” “after an extended project.” The goal in formative assessment is to monitor learning as it is happening. Imagine the teacher working with a zoom lens, focusing for an instant on a student’s question, zooming out to see how a project is coming along, or taking stock of students’ achievements at the end of a quarter.

Grain size describes the level of detail that the teacher takes in during an assessment event. A brief look is typically fine grained, while a longer look will mean broader coverage and less detail. Charlie appears distracted during a discussion of *Bear Mouse*, a nature story about how a mother mouse takes care of her babies during a winter day. From the teacher, “Charlie, what’s on your mind?” Charlie reveals that his mother has just had a baby, and is in the hospital with complications. *Bear Mouse* now connects to experiences shared by many students, a natural lead-in to the story theme. Suppose the teacher, rather than asking the question, had said, “Charlie, pay attention to the story!” Both questions are brief and fine grained, but they illustrate the difference between an inquiry stance and a management tactic.

**Figure 2.** Cycle Time and Grain Size Dimensions for Conducting Formative Assessment.
The cycle time categories may seem arbitrary, and they are, but they help in thinking about the relation between how and when. In the middle of an intense student discussion, the teacher spots something that needs a quick and careful look: an unexpected comment, a puzzled expression, an “I don’t know” response, or several blank stares. How should the teacher react? Perhaps it is a time to stop the music and delve into what is on students’ minds, even though this decision may upset the schedule. Inquiry under these conditions cannot be preplanned, but it can be systematic (Heritage, Kim, Vendlinski, & Herman, 2009; Popham, 2008, pp. 6ff). Even spur-of-the-moment questions can be principled—what is the problem, what does the evidence suggest, what are the possibilities for next steps? Formative assessment at the end of a quarter or semester has a different purpose, uses different methods, and produces a different outcome than the momentary response. It is still a matter of inquiry, but the evidence may entail review of student portfolios, the documentation may be journal entries, and decision may mean adjusting plans for the coming quarter.

Below are brief sketches for each cycle-time or grain-size category, offering additional detail about methods that apply to that category. Most of the strategies—questioning, quizzes, portfolios, and so on—will be familiar to practitioners. The contribution of the Herman-Heritage concept is to place these strategies into a purposeful system for guiding decisions.

- **Moment-by-Moment**: The time slice is short, and the activity consists of spontaneous interactions based on questioning, observations, and student queries (Black & William, 1998, 2004). These events can seldom be planned in advance, but can nonetheless be strategic. Some types of questions are better than others at eliciting responses. For example, “yes-no” queries generate yes-no responses, which will not be helpful unless followed by “Why? Tell me more about that.” Asking for explanations can be informative, but only if students have learned how to construct and present an explanatory response, and if the teacher provides adequate wait time. Better yet are open-ended questions designed to scaffold open-ended responses (Darling-Hammond & Bransford, 2005, pp. 106-109). Graphic-organizer techniques offer opportunities for students to practice thinking out loud. The key is to practice the skill with a familiar topic. Even the youngest students have lots to say about food, the weather, and their “favorite things.” Spending a few minutes “webbing” on familiar matters can pay off through transfer to unfamiliar and difficult topics: “What are some words that make you think about energy?” Interactions in this category are generally rapid-fire “teachable moments,” but they are important parts of students’ portfolio of communication strategy.

- **Lesson**: A 15-50 minute time slice with a definite beginning, middle, and end, lessons are foundational for instructional planning. They are generally preplanned with specific purposes and objectives: introduce a new project, review progress, provide an opportunity for student presentations, and so on. Lessons can incorporate a variety of assessment activities, including quick quizzes, review homework, and small group assignments, some of which can be test-like. It often makes sense to end a lesson with a genuine review—“a looking back.” What do students think they have learned from the lesson? If the answer is “Not sure,” the assessment is especially worthwhile—students should learn to monitor their own progress as they move through the grades. These end-of-lesson assessments, whether preplanned and structured or open ended, are formative when they are used to adapt the next lesson, to arrange small group assignments, or to develop plans for the following week (Corno, 2008). The teacher may decide that the evidence calls for further study or practice on a specific topic or skill, or it may lead to a decision to jump ahead. One of the more radical suggestions in the standards is advice to “teach students what they need to learn and not what they already know, to discern when particular children or activities warrant more or less attention” (p. 15). Formative assessment can lead to a decision to “jump ahead” or “recast” with a different approach in flexible groupings or as a whole class.

- **Project/Unit**: Extended activities lasting one to three weeks, organized around a mega-cluster standard like Research to Build and Present Knowledge. Projects may spring from a variety of sources, including published or digital materials, topics of current interest, or simple curiosity. A rich array of models can be found on the web, including the Buck Foundation, Edutopia, and Expeditionary.com. Off-the-shelf packages provide useful ideas and starting points, but seldom include formative assessment. Sites are beginning to mention the standards, but seldom do they build on a standards-based strategy. We are finding it useful to organize project designs around the PPP acronym—Problem, Process, Product. These bare-bones elements are easy to remember, they quickly set the stage for exploring a topic or theme within a standards-based context, and they provide a framework for attending to assessment. The process can incorporate various documentation strategies, including journaling, note taking, portfolios, and so on, consistent with best practice in real world applications. The end-of-unit products are often well-suited to judgment strategies and the use of rubric systems.

- **Quarter/Year**: End-of-quarter and end-of-year assessments serve for benchmarking student accomplishments against standards expectations. Under No Child Left Behind (NCLB), interim tests that mirror summative tests in content and task design may be mandated, but these do not constitute formative assessment. Our suggestion in this category is teacher review of student accomplishments across the full spectrum of the standards, based on evidence from a variety of activities in which students have had adequate time and resources to demonstrate what they know and can do. The purpose is to provide broad-spectrum feedback as a basis for long-range adaptations. Changes can be based on achievement patterns revealing areas that need more attention or that are in good shape. Revisions may also take into account student interests or current events. Broad-spectrum assessments can be the target for the “new conceptualizations of reliability and validity” mentioned by Shepard (2006), setting the stage for teacher judgments to play a role in accountability.
CONNECTING THE PIECES.

The two preceding sections have been presented separately, but in practice they need to be brought together. Our initial effort along these lines is shown in Figure 3, which suggests a comprehensive design for standards-based formative assessment. Each cycle-time/grain-size slice has unique features with regard to the purpose and utility of the evidence, the amount of planning and analysis needed for interpretation, and the specifics of the inquiry method. The matrix arrangement shows how the parts operate in combination. It provides a conceptual framework for guiding practice, and as a “mental model” for the teacher. One consequence of defining formative assessment as a process rather than a test is that, while various elements and materials can be packaged to support teachers, the full benefits are realized only when the complete design resides in the teacher’s mind. We can imagine the matrix serving for the design and development of professional development programs, providing a template for tracking the dynamics of formative assessment in action, for describing scenarios and vignettes, and for planning and documenting formative assessment activities in various scenarios. We do not have space in this paper to expand on these ideas, but keep the matrix in mind as you read the vignettes in the next section, which portrays the model at work in classroom settings.

Figure 3. Matrix for Combining Inquiry Methods with the CycleTime/GrainSize Dimensions of Formative Assessment

<table>
<thead>
<tr>
<th>Grain Size</th>
<th>Cycle Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify Question</td>
<td>Moment</td>
</tr>
<tr>
<td></td>
<td>Lesson</td>
</tr>
<tr>
<td>Develop Plan</td>
<td>Unit</td>
</tr>
<tr>
<td>Collect Evidence</td>
<td>Quarter/Year</td>
</tr>
<tr>
<td>Analyze &amp; Evaluate</td>
<td></td>
</tr>
<tr>
<td>Review and Reflect</td>
<td></td>
</tr>
<tr>
<td>Take Action</td>
<td></td>
</tr>
<tr>
<td>Review, Document</td>
<td></td>
</tr>
</tbody>
</table>

FORMATIVE ASSESSMENT IN ACTION: TWO VIGNETTES.

The preceding material has been fairly abstract, and may seem remote from the complexities of classroom practice. The following scenarios attempt, within limited space, to bring life to the concepts. For the ideas to take root, vignettes like these will be needed to populate the virtual worlds of the Common Core Literacy Standards.

FIFTH-GRADE ENERGY IN ACTION.

It is a Monday morning early in the school year, and Nancy Crenshaw is introducing her fifth graders to a unit on energy. She had asked the class on Friday to think about the topic over the weekend. She opens with a fast-paced 8-10 minute activity to discover what students already know about the topic. “Write down whatever comes to mind when you think of energy. Use the post-it notes on your table. Talk to each other about what you have in mind.” The room buzzes with voices. Crenshaw sees that students at one table appear to be having a private conversation. She moves over to the group and discovers that Sam’s father had told Sam the previous evening that “energy never disappears. It just keeps changing.” Crenshaw makes a mental note; Sam was discussing class work with his father. “What do you guys think Sam’s father meant? Is he saying that we don’t have to worry about conserving energy? Really?” Other groups tuned in to the conversation, and Sam’s story spreads around the room. At one table the students come up with the idea of “energy transformers”—gasoline burns and the engine turns the car wheels; water surges through turbines at Hoover Dam, and electricity pulses through the power lines. They are talking about inventing transformers.
Crenshaw circulates among groups, jotting notes, refocusing question-answer patterns. Her zoom lens moves back and forth from details—question-answer sequences—to larger patterns—ways in which students take different roles. She captures several unusual “energy words,” which she will add to the concept map that she plans to introduce. Science is not Crenshaw’s strong suit, but she appreciates the value of the students’ work. Sam has been labeled a “struggling reader,” but he is clearly excited about students’ reactions to his offering, and has scribbled notes in his journal to share with his father.

Crenshaw zooms out to reflect on adjustments to her previous plans for the project, which were to construct a web to flesh out a more nuanced idea of conserving energy. Why conserve energy if it never disappears? The transformation of energy from one form to another is a giant conceptual leap for young children. It had been covered briefly in fourth grade, but Crenshaw doubts that it “stuck.” She is not entirely confident about her own grasp of the idea. That evening, a quick search on her tablet PC turns up several starter questions to bring to the class.

Imagine how you might use the matrix to document this narrative, identifying formative assessment events, and posting these in the cells as a way of capturing the action. Our anecdote has skipped over many events: Crenshaw’s documentations, her observational “reports,” parent notes, memos to the principal, and her plan for a back-to-school event. She plans to include a narrative text box in the winter report cards to describe students’ accomplishments.

EIGHTH GRADE AND TAXES.

This vignette covers an extended time frame, illustrating the large grain sizes typical of a long-term research project. Envision Ms. McCormick’s path through the matrix as you read this account and think about how it helps to track her inquiry as she moves through the unit, as she zooms in and out, now a momentary focus on one student, then a reading of the class as a whole, some planned events and others that were unanticipated.

The next vignette takes place in January 2016, in Ms. McCormick’s four eighth-grade social studies classes. She had conducted a few mini-assessments during the fall quarter, but her first foray into full-scale formative assessment will be a project on taxes. She had also conducted a one-week project a few years earlier with a class of high-ability students. This project will be longer, and the students more varied. Most are poor note takers, with no experience in public speaking. She is starting from the Research to Build and Present Knowledge cluster, to which she is adding the speaking/listening cluster.

In the world outside the classroom, the 2016 election campaign has taken center stage in the fall, with financial issues in the spotlight. The economy has recovered from the 2008 recession, and the national debate is about taxes. McCormick had discussed the project with her classes before the winter vacation. Her students seemed aware of the elections and know that money is an important issue. McCormick passed out a letter for parents announcing the project. She reviewed state social studies standards to see how taxes are covered, finding little to work with. She has tentative plans for beginning the project, monitoring progress, and evaluating the final products. The end date for the project is Friday, January 29, a back-to-school night.

The project begins in January with brainstorming sessions about money and taxes and formation of study teams in each class. The sessions confirm that students are interested in money but are rather vague about taxes. Some students had talked with their parents about the topic during vacation; two parents who were tax accountants offered to visit the classes. The first part of January is busy. One team turned up more than 150 million hits during a Google search. The textbooks were not especially helpful, but the librarian fills the gap. By the second week, a few significant themes have emerged: how taxes are collected, from whom and how the money is spent. Study teams are documenting their findings in project notebooks, and individual students have entries in personal journals. McCormick had provided note-taking guidelines at the beginning of the project.

The students are focused on taxes, and McCormick is reviewing the notebooks and journals for evidence of learning. In planning the project, McCormick decided to focus on documentation. She has set aside 5 minutes at the end of each class for a journaling activity; students, individually or in groups, jot down notes about their work. She had introduced journaling in September, so students are familiar with the activity. On Friday, each group updates its progress report. McCormick reads the reports over the weekend and reviews the results on Monday. Her reviews are quick and impressionistic. She is not assigning grades, nor is she using rubrics. Her aim is to study what the students are doing, to locate the promising outcomes and think about ways to fill the gaps.

How will this story turn out? It is tempting to build one or more endings, but instead we will pose questions about this scenario. For example, how is McCormick going to eventually assign individual grades, given differences in what students are doing and how they are performing? She could test the students on content knowledge, on what have they learned about economics and tax policies. The project also covers the speaking/listening domain. The project was the first experience for many students in public speaking. Each class constructed a concept web on making a speech, and there was
general agreement that speaking in public was “scary.” This discovery might be an important learning outcome in its own right.

The standards are silent on matters such as grading. They establish high expectations for students and teachers, but do not specify the means by which these expectations are to be supported, evaluated, and reported. They emphasize learning, both process and product. They are explicit about the meaning of literacy and about the critical importance of connecting literacy with the disciplines. But they leave to teachers the decisions about what to teach and how to teach it.

McCormick is becoming confident that she is learning more about the contributions of the project to student learning. She knows the field of social studies, and she is orchestrating the “Tax Project” based on her disciplinary expertise. Are the students learning something about taxes and money? Yes. What are they learning? McCormick has documented answers to these questions, so she can explain to others what she is finding. Students are learning that they pay taxes, that their parents pay taxes, that taxes differ across families, that taxes provide services and benefits, and that the process of establishing taxation in our society is a matter of some disagreement. They are also learning some important lessons about literacy. They are showing signs that they can analyze authentic texts, which are quite unlike textbooks. They have gained experience in the preparation and production of a town-hall meeting, in collecting information, reviewing and organizing the results, and in constructing and presenting their work. They are becoming more adept in communication and negotiation, which McCormick sees as especially significant. She is preparing reports for each student about their project performance.

REALIZING THE VISION OF THE STANDARDS

In 2004, Achieve published Ready or Not: Creating a High School Diploma that Counts. The American Diploma Project, as it was called, proposed that graduates possess “the strong oral and written communication skills that are staples in college classrooms and most 21st century jobs. [They need] the analytic and reasoning skills associated with advanced or honors courses in high school” (Achieve, 2004, p. 4). That call was sounded a decade ago. The standards, building on this foundation, have laid out a vision for K-12 schooling designed to ensure that all students attain these expectations. The proposal to combine project-based activities with inquiry-based formative assessment offers a workable plan for implementing the standards.

The standards call for fundamental change, which is difficult for large and entrenched institutions (Cuban, 2001). The development and adoption of the standards was fundamental in many ways (McDonnell & Weatherford, 2013), but that task has been accomplished. Implementation of the standards also requires fundamental changes, but these will be more difficult to bring about, because implementation calls for conceptual changes in the core elements of classroom activities, in how teachers and administrators conceive of learning and instruction (Elmore, 2004; Fullan, 2005, especially Keating, 2005, chapter; Vosniadou, 2013), and in how outcomes are assessed and evaluated, which we described earlier as a shift from “grading” to “growing.” Current developments seem to be continuing the status quo of test-based accountability practices under NCLB.

The current status of formative assessment, as we go to press, is not especially promising. Gewertz (2014) describes a session in which 48 language-arts teachers discuss a video that is being vetted for inclusion in the SBAC digital library. The article looks more broadly at what is happening in the “formative testing” (sic) arena. The asides warrant attention: “Many teachers knew only about Smarter Balanced’s year-end tests,” but were delighted to hear that formative assessments were also under development. . . . Some teachers were unclear about the distinction between interim and formative assessment . . ., many educators think of formative assessment as a pop quiz.” From Chrys Mursky, director of professional learning for Smarter Balanced, “teachers need to keep four things in mind for sound formative-assessment practice: clearly laying out what they want students to learn, eliciting evidence of that learning, interpreting that evidence, and acting on the evidence to adjust their teaching,” which answers the what question, but leaves open how and when.

One matter of paramount importance if the nation’s schools are to realize the vision of the standards is the task of creating (or recreating) the school as the center of professional work (Darling-Hammond & Bransford, 2005; Schaefer, 1967; also cf. Young, Bryant, & Roeber, 2010) for a working example, and note comment by Kahl that formative assessment requires professional development that leads to “a change of mind-set and whole school involvement,” (p. 2). This job calls for substantial and sustained professional redevelopment, taking the standards as a rallying point, drawing upon the best available evidence to identify and adapt programs whose effectiveness comes not from standardized test scores, but from outcomes and accomplishments that are valued under the standards. The best hope, under the present circumstances, may be that, in out-of-the-way places throughout the country, visionary leaders in districts serving students especially in need of a 21st century education will initiate programs of extensive and long-term school-based professional development—emphasis on professional—that return responsibility and authority to educators. The entire nation might benefit from the results of such “skunk works” (Rich & Janos, 1994), from the efforts of groups who believe that the standards are achievable, and who do not believe that “some must fail” (Labaree, 2010). Today’s reality is that “many are failing.” What is needed is not more testing, but more opportunities to learn (McDonnell, 1995). Our aim in this paper has been to present conceptual ideas and practical tools for supporting effective formative assessment strategies that are likely to be an essential element in bringing about the vision of the standards. As noted at the outset, the proposal builds on the work of many others, and as a fitting close, here are words from Ann Brown (1992), a pioneer in applying the learning sciences to
classroom practice, words that span more than two decades, but that ring true for the challenges that lie ahead:

“Guided learning is easier to talk about than to do. It takes clinical judgment to know when to intervene. Successful teachers must engage continually in on-line diagnosis of student understanding. They must be sensitive to overlapping zones of proximal development, where [and when] students are ripe for new learning. Guided discovery places a great deal of responsibility in the hands of teachers, who must model, foster, and guide the ‘discovery’ process into forms of disciplined inquiry that would not be reached without expert guidance.” (p. 169)

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