Red, Yellow, Green, GO:

Simple Tools to Involve Students in the

Assessment Process

Presented by Marissa Vuich,

Charter School for Applied Technologies

Assessment for Learning Pretest

- What is assessment for learning and how can it enhance student learning?

- Give an example of a kid friendly "I can" statement.

- Explain one possible rating system you could use to help your students track their progress.

Assessment for Learning Post-test

- What is assessment for learning and how can it enhance student learning?

- Give an example of a kid friendly "I can" statement.

- Explain one possible rating system you could use to help your students track their progress.

1. I can explain what AFL is.

1st Try	2nd Try	3rd Try	Final Try

Assessment for Learning is.....

2. I can use NYS standards to write kid-friendly I can statements or in kid-friendly terms.

1st Try	2nd Try	3rd Try	Final Try

Using NYS standards, write at least one kid-friendly statement that you could use in your classroom.

1.

2.

3. I can develop and teach my students how to use a rating system that will allow them to own their learning and allow me to frequently check and redirect my teaching and their learning.

1st Try	2nd Try	3rd Try	Final Try

There are many different ways students can rate themselves. Some examples that could be used are smiley faces, stop light colors, scales from 1-10, and percentages.

What will this look like in your room?

Describe the rating system you would like to use....

4. I can develop engaging student-directed learning activities based on students needs at various levels.

1st Try	2nd Try	3rd Try	Final Try

Based on your rating system, students will categorize themselves for you as to where they stand on given skills. You will need to have specific activities planned that they can work on to enhance, enrich, and remediate in those areas.

Using your kid-friendly standards, develop a plan for how this will work in your classroom for any one standard.

        For example: my on-level students will complete_____ practicing and reinforcing this specific skill, my mastery students will_____ ,enriching their knowledge in this area, my below-level students will _____ in order to remediate and/or learn this skill.

        On-level students will....

        Mastery students will....

        Below-level students will....

Assessment for Learning

-Articles
-Tracking Sheets
-Student Packets

Inside the Black Box: Raising Standards Through Classroom Assessment

By Paul Black and Dylan Wiliam

Firm evidence shows that formative assessment is an essential component of classroom work and that its development can raise standards of achievement, Mr. Black and Mr. Wiliam point out. Indeed, they know of no other way of raising standards for which such a strong prima facie case can be made.
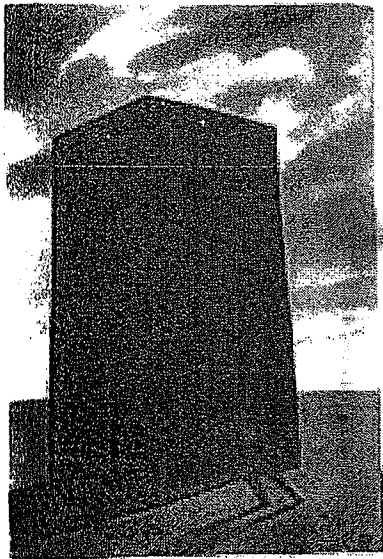

Illustration © 1998 by A. J. Garces

RAISING the standards of learning that are achieved through schooling is an important national priority. In recent years, governments throughout the world have been more and more vigorous in making changes in pursuit of this aim. National, state, and district standards; target setting; enhanced programs for the external testing of students' performance; surveys such as NAEP (National Assessment of Educational Progress) and TIMSS (Third International Mathematics and Science Study); initiatives to improve school planning and management; and more frequent and thorough inspection are all means toward the same end. But the sum of all these reforms has not added up to an effective policy because something is missing.

Learning is driven by what teachers and pupils do in classrooms. Teachers have to manage complicated and demanding situations, channeling the personal, emotional, and social pressures of a group of 30 or more youngsters in order to help them learn immediately and become better learners in the future. Standards can be raised only if teachers can tackle this task more effectively. What is missing from the efforts alluded to above is any direct help with this task. This fact was recognized in the TIMSS video study: "A focus on standards and accountability that ignores the processes of teaching and learning in classrooms will not provide the direction that teachers need in their quest to improve."[1]

In terms of systems engineering, present policies in the U.S. and in many other countries seem to treat the classroom as a black box. Certain inputs from the outside -- pupils, teachers, other resources, management rules and requirements, parental anxieties, standards, tests with high stakes, and so on -- are fed into the box. Some outputs are supposed to follow: pupils who are more knowledgeable and competent, better test results, teachers who are reasonably satisfied, and so on. But what is happening inside the box? How can anyone be sure that a particular set of new inputs will produce better outputs if we don't at least study what happens inside? And why is it that most of the reform initiatives mentioned in the first paragraph are not aimed at giving direct help and support to the work of teachers in classrooms?

The answer usually given is that it is up to teachers: they have to make the inside work better. This answer is not good enough, for two reasons. First, it is at least possible that some changes in the inputs may be counterproductive and make it harder for teachers to raise standards. Second, it seems strange, even unfair, to leave the most difficult piece of the standards-raising puzzle entirely to teachers. If there are ways in which policy makers and others can give direct help and support to the everyday classroom task of achieving better learning, then surely these ways ought to be pursued vigorously.

This article is about the inside of the black box. We focus on one aspect of teaching: formative assessment. But we will show that this feature is at the heart of effective teaching.

The Argument

We start from the self-evident proposition that teaching and learning must be interactive. Teachers need to know about their pupils' progress and

1

difficulties with learning so that they can adapt their own work to meet pupils' needs -- needs that are often unpredictable and that vary from one pupil to another. Teachers can find out what they need to know in a variety of ways, including observation and discussion in the classroom and the reading of pupils' written work.

We use the general term assessment to refer to all those activities undertaken by teachers -- and by their students in assessing themselves -- that provide information to be used as feedback to modify teaching and learning activities. Such assessment becomes formative assessment when the evidence is actually used to adapt the teaching to meet student needs.2

There is nothing new about any of this. All teachers make assessments in every class they teach. But there are three important questions about this process that we seek to answer:

- ❑ Is there evidence that improving formative assessment raises standards?
- ❑ Is there evidence that there is room for improvement?
- ❑ Is there evidence about how to improve formative assessment?

In setting out to answer these questions, we have conducted an extensive survey of the research literature. We have checked through many books and through the past nine years' worth of issues of more than 160 journals, and we have studied earlier reviews of research. This process yielded about 580 articles or chapters to study. We prepared a lengthy review, using material from 250 of these sources, that has been published in a special issue of the journal Assessment in Education, together with comments on our work by leading educational experts from Australia, Switzerland, Hong Kong, Lesotho, and the U.S.3

The conclusion we have reached from our research review is that the answer to each of the three questions above is clearly yes. In the three main sections below, we outline the nature and force of the evidence that justifies this conclusion. However, because we are presenting a summary here, our text will appear strong on assertions and weak on the details of their justification. We maintain that these assertions are backed by evidence and that this backing is set out in full detail in the lengthy review on which this article is founded.

We believe that the three sections below establish a strong case that governments, their agencies, school authorities, and the teaching profession should study very carefully whether they are seriously interested in raising standards in education. However, we also acknowledge widespread evidence that fundamental change in education can be achieved only slowly -- through programs of professional development that build on existing good practice. Thus we do not conclude that formative assessment is yet another "magic bullet" for education. The issues involved are too complex and too closely linked to both the difficulties of classroom practice and the beliefs that drive public policy. In a final section, we confront this complexity and try to sketch out a strategy for acting on our evidence.

Does Improving Formative Assessment Raise Standards?

A research review published in 1986, concentrating primarily on classroom assessment work for children with mild handicaps, surveyed a large number of innovations, from which 23 were selected.4 Those chosen satisfied the condition that quantitative evidence of learning gains was obtained, both for those involved in the innovation and for a similar group not so involved. Since then, many more papers have been published describing similarly careful quantitative experiments. Our own review has selected at least 20 more studies. (The number depends on how rigorous a set of selection criteria are applied.) All these studies show that innovations that include strengthening the practice of formative assessment produce significant and often substantial learning gains. These studies range over age groups from 5-year-olds to university undergraduates, across several school subjects, and over several countries.

For research purposes, learning gains of this type are measured by comparing the average improvements in the test scores of pupils involved in an innovation with the range of scores that are found for typical groups of pupils on these same tests. The ratio of the former divided by the latter is known as the effect size. Typical effect sizes of the formative assessment experiments were between 0.4 and 0.7. These effect sizes are larger than most of those found for educational interventions. The following examples illustrate some practical consequences of such large gains.

2

- An effect size of 0.4 would mean that the average pupil involved in an innovation would record the same achievement as a pupil in the top 35% of those not so involved.
- An effect size gain of 0.7 in the recent international comparative studies in mathematics5 would have raised the score of a nation in the middle of the pack of 41 countries (e.g., the U.S.) to one of the top five.

Many of these studies arrive at another important conclusion: that improved formative assessment helps low achievers more than other students and so reduces the range of achievement while raising achievement overall. A notable recent example is a study devoted entirely to low-achieving students and students with learning disabilities, which shows that frequent assessment feedback helps both groups enhance their learning.6 Any gains for such pupils could be particularly important. Furthermore, pupils who come to see themselves as unable to learn usually cease to take school seriously. Many become disruptive; others resort to truancy. Such young people are likely to be alienated from society and to become the sources and the victims of serious social problems.

Thus it seems clear that very significant learning gains lie within our grasp. The fact that such gains have been achieved by a variety of methods that have, as a common feature, enhanced formative assessment suggests that this feature accounts, at least in part, for the successes. However, it does not follow that it would be an easy matter to achieve such gains on a wide scale in normal classrooms. Many of the reports we have studied raise a number of other issues.

- All such work involves new ways to enhance feedback between those taught and the teacher, ways that will require significant changes in classroom practice.
- Underlying the various approaches are assumptions about what makes for effective learning -- in particular the assumption that students have to be actively involved.
- For assessment to function formatively, the results have to be used to adjust teaching and learning; thus a significant aspect of any program will be the ways in which teachers make these adjustments.

- The ways in which assessment can affect the motivation and self-esteem of pupils and the benefits of engaging pupils in self-assessment deserve careful attention.

Is There Room for Improvement?

A poverty of practice. There is a wealth of research evidence that the everyday practice of assessment in classrooms is beset with problems and shortcomings, as the following selected quotations indicate.

"Marking is usually conscientious but often fails to offer guidance on how work can be improved. In a significant minority of cases, marking reinforces underachievement and underexpectation by being too generous or unfocused. Information about pupil performance received by the teacher is insufficiently used to inform subsequent work," according to a United Kingdom inspection report on secondary schools.7

"Why is the extent and nature of formative assessment in science so impoverished?" asked a research study on secondary science teachers in the United Kingdom.8

"Indeed they pay lip service to [formative assessment] but consider that its practice is unrealistic in the present educational context," reported a study of Canadian secondary teachers.9

"The assessment practices outlined above are not common, even though these kinds of approaches are now widely promoted in the professional literature," according to a review of assessment practices in U.S. schools.10

The most important difficulties with assessment revolve around three issues. The first issue is effective learning.

- The tests used by teachers encourage rote and superficial learning even when teachers say they want to develop understanding; many teachers seem unaware of the inconsistency.
- The questions and other methods teachers use are not shared with other teachers in the same school, and they are not critically reviewed in relation to what they actually assess.
- For primary teachers particularly, there is a tendency to emphasize quantity and

presentation of work and to neglect its quality in relation to learning.

The second issue is negative impact.

☐ The giving of marks and the grading function are overemphasized, while the giving of useful advice and the learning function are underemphasized.

☐ Approaches are used in which pupils are compared with one another, the prime purpose of which seems to them to be competition rather than personal improvement; in consequence,

☐ Assessment feedback teaches low-achieving pupils that they lack "ability," causing them to come to believe that they are not able to learn.

The third issue is the managerial role of assessments.

☐ Teachers' feedback to pupils seems to serve social and managerial functions, often at the expense of the learning function.

☐ Teachers are often able to predict pupils' results on external tests because their own tests imitate them, but at the same time teachers know too little about their pupils' learning needs.

☐ The collection of marks to fill in records is given higher priority than the analysis of pupils' work to discern learning needs; furthermore, some teachers pay no attention to the assessment

☐ Records of their pupils' previous teachers.

Of course, not all these descriptions apply to all classrooms. Indeed, there are many schools and classrooms to which they do not apply at all. Nevertheless, these general conclusions have been drawn by researchers who have collected evidence -- through observation, interviews, and questionnaires -- from schools in several countries, including the U.S.

An empty commitment. The development of national assessment policy in England and Wales over the last decade illustrates the obstacles that stand in the way of developing policy support for formative assessment. The recommendations of a government task force in 1988[11] and all subsequent statements of government policy have emphasized the importance of formative assessment by teachers. However, the body charged with carrying out government policy on assessment had no strategy either to study or to develop the formative assessment of teachers and did no more than devote a tiny fraction of its resources to such work.[12] Most of the available resources and most of the public and political attention were focused on national external tests. While teachers' contributions to these "summative assessments" have been given some formal status, hardly any attention has been paid to their contributions through formative assessment. Moreover, the problems of the relationship between teachers' formative and summative roles have received no attention.

It is possible that many of the commitments were stated in the belief that formative assessment was not problematic, that it already happened all the time and needed no more than formal acknowledgment of its existence. However, it is also clear that the political commitment to external testing in order to promote competition had a central priority, while the commitment to formative assessment was marginal. As researchers the world over have found, high-stakes external tests always dominate teaching and assessment. However, they give teachers poor models for formative assessment because of their limited function of providing overall summaries of achievement rather than helpful diagnosis. Given this fact, it is hardly surprising that numerous research studies of the implementation of the education reforms in the United Kingdom have found that formative assessment is "seriously in need of development."[13] With hindsight, we can see that the failure to perceive the need for substantial support for formative assessment and to take responsibility for developing such support was a serious error.

In the U.S. similar pressures have been felt from political movements characterized by a distrust of teachers and a belief that external testing will, on its own, improve learning. Such fractured relationships between policy makers and the teaching profession are not inevitable -- indeed, many countries with enviable educational achievements seem to manage well with policies that show greater respect and support for teachers. While the situation in the U.S. is far more diverse than that in England and Wales, the effects of high-stakes state-mandated testing are very similar to those of the external tests in the United Kingdom. Moreover, the traditional reliance on multiple-choice testing in the U.S. -- not shared in the United Kingdom -- has exacerbated the

4

negative effects of such policies on the quality of classroom learning.

How Can We Improve Formative Assessment?

The self-esteem of pupils:

A report of schools in Switzerland states that "a number of pupils . . . are content to 'get by.' . . . Every teacher who wants to practice formative assessment must reconstruct the teaching contracts so as to counteract the habits acquired by his pupils."14

The ultimate user of assessment information that is elicited in order to improve learning is the pupil. There are negative and positive aspects of this fact. The negative aspect is illustrated by the preceding quotation. When the classroom culture focuses on rewards, "gold stars," grades, or class ranking, then pupils look for ways to obtain the best marks rather than to improve their learning. One reported consequence is that, when they have any choice, pupils avoid difficult tasks. They also spend time and energy looking for clues to the "right answer." Indeed, many become reluctant to ask questions out of a fear of failure. Pupils who encounter difficulties are led to believe that they lack ability, and this belief leads them to attribute their difficulties to a defect in themselves about which they cannot do a great deal. Thus they avoid investing effort in learning that can lead only to disappointment, and they try to build up their self-esteem in other ways.

The positive aspect of students' being the primary users of the information gleaned from formative assessments is that negative outcomes -- such as an obsessive focus on competition and the attendant fear of failure on the part of low achievers -- are not inevitable. What is needed is a culture of success, backed by a belief that all pupils can achieve. In this regard, formative assessment can be a powerful weapon if it is communicated in the right way. While formative assessment can help all pupils, it yields particularly good results with low achievers by concentrating on specific problems with their work and giving them a clear understanding of what is wrong and how to put it right. Pupils can accept and work with such messages, provided that they are not clouded by overtones about ability, competition, and comparison with others. In summary, the message can be stated as follows: feedback to any pupil should be about the particular qualities of his or her work, with advice on what he or she can do to improve, and should avoid comparisons with other pupils.

Self-assessment by pupils:

Many successful innovations have developed self- and peer-assessment by pupils as ways of enhancing formative assessment, and such work has achieved some success with pupils from age 5 upward. This link of formative assessment to self-assessment is not an accident; indeed, it is inevitable.

To explain this last statement, we should first note that the main problem that those who are developing self-assessments encounter is not a problem of reliability and trustworthiness. Pupils are generally honest and reliable in assessing both themselves and one another; they can even be too hard on themselves. The main problem is that pupils can assess themselves only when they have a sufficiently clear picture of the targets that their learning is meant to attain. Surprisingly, and sadly, many pupils do not have such a picture, and they appear to have become accustomed to receiving classroom teaching as an arbitrary sequence of exercises with no overarching rationale. To overcome this pattern of passive reception requires hard and sustained work. When pupils do acquire such an overview, they then become more committed and more effective as learners. Moreover, their own assessments become an object of discussion with their teachers and with one another, and this discussion further promotes the reflection on one's own thinking that is essential to good learning.

Thus self-assessment by pupils, far from being a luxury, is in fact an essential component of formative assessment. When anyone is trying to learn, feedback about the effort has three elements: recognition of the desired goal, evidence about present position, and some understanding of a way to close the gap between the two.15 All three must be understood to some degree by anyone before he or she can take action to improve learning.

Such an argument is consistent with more general ideas established by research into the way people learn. New understandings are not simply swallowed and stored in isolation; they have to be assimilated in relation to preexisting ideas. The new and the old may be inconsistent or even in conflict,

5

and the disparities must be resolved by thoughtful actions on the part of the learner. Realizing that there are new goals for the learning is an essential part of this process of assimilation. Thus we conclude: if formative assessment is to be productive, pupils should be trained in self-assessment so that they can understand the main purposes of their learning and thereby grasp what they need to do to achieve.

The evolution of effective teaching. The research studies referred to above show very clearly that effective programs of formative assessment involve far more than the addition of a few observations and tests to an existing program. They require careful scrutiny of all the main components of a teaching plan. Indeed, it is clear that instruction and formative assessment are indivisible.

To begin at the beginning, the choice of tasks for classroom work and homework is important. Tasks have to be justified in terms of the learning aims that they serve, and they can work well only if opportunities for pupils to communicate their evolving understanding are built into the planning. Discussion, observation of activities, and marking of written work can all be used to provide those opportunities, but it is then important to look at or listen carefully to the talk, the writing, and the actions through which pupils develop and display the state of their understanding. Thus we maintain that opportunities for pupils to express their understanding should be designed into any piece of teaching, for this will initiate the interaction through which formative assessment aids learning.

Discussions in which pupils are led to talk about their understanding in their own ways are important aids to increasing knowledge and improving understanding. Dialogue with the teacher provides the opportunity for the teacher to respond to and reorient a pupil's thinking. However, there are clearly recorded examples of such discussions in which teachers have, quite unconsciously, responded in ways that would inhibit the future learning of a pupil. What the examples have in common is that the teacher is looking for a particular response and lacks the flexibility or the confidence to deal with
the unexpected. So the teacher tries to direct the pupil toward giving the expected answer. In manipulating the dialogue in this way, the teacher seals off any unusual, often thoughtful but unorthodox, attempts by pupils to work out their

own answers. Over time the pupils get the message: they are not required to think out their own answers. The object of the exercise is to work out -- or guess -- what answer the teacher expects to see or hear.

A particular feature of the talk between teacher and pupils is the asking of questions by the teacher. This natural and direct way of checking on learning is often unproductive. One common problem is that, following a question, teachers do not wait long enough to allow pupils to think out their answers. When a teacher answers his or her own question after only two or three seconds and when a minute of silence is not tolerable, there is no possibility that a pupil can think out what to say.

There are then two consequences. One is that, because the only questions that can produce answers in such a short time are questions of fact, these predominate. The other is that pupils don't even try to think out a response. Because they know that the answer, followed by another question, will come along in a few seconds, there is no point in trying. It is also generally the case that only a few pupils in a class answer the teacher's questions. The rest then leave it to these few, knowing that they cannot respond as quickly and being unwilling to risk making mistakes in public. So the teacher, by lowering the level of questions and by accepting answers from a few, can keep the lesson going but is actually out of touch with the understanding of most of the class. The question/answer dialogue becomes a ritual, one in which thoughtful involvement suffers.

There are several ways to break this particular cycle. They involve giving pupils time to respond; asking them to discuss their thinking in pairs or in small groups, so that a respondent is speaking on behalf of others; giving pupils a choice between different possible answers and asking them to vote on the options; asking all of them to write down an answer and then reading out a selected few; and so on. What is essential is that any dialogue should evoke thoughtful reflection in which all pupils can be encouraged to take part, for only then can the formative process start to work. In short, the dialogue between pupils and a teacher should be thoughtful, reflective, focused to evoke and explore understanding, and conducted so that all pupils have an opportunity to think and to express their ideas.

Tests given in class and tests and other exercises assigned for homework are also important means of

6

promoting feedback. A good test can be an occasion for learning. It is better to have frequent short tests than infrequent long ones. Any new learning should first be tested within about a week of a first encounter, but more frequent tests are counterproductive. The quality of the test items -- that is, their relevance to the main learning aims and their clear communication to the pupil -- requires scrutiny as well. Good questions are hard to generate, and teachers should collaborate and draw on outside sources to collect such questions.

Given questions of good quality, it is essential to ensure the quality of the feedback. Research studies have shown that, if pupils are given only marks or grades, they do not benefit from the feedback. The worst scenario is one in which some pupils who get low marks this time also got low marks last time and come to expect to get low marks next time. This cycle of repeated failure becomes part of a shared belief between such students and their teacher. Feedback has been shown to improve learning when it gives each pupil specific guidance on strengths and weaknesses, preferably without any overall marks. Thus the way in which test results are reported to pupils so that they can identify their own strengths and weaknesses is critical. Pupils must be given the means and opportunities to work with evidence of their difficulties. For formative purposes, a test at the end of a unit or teaching module is pointless; it is too late to work with the results. We conclude that the feedback on tests, seatwork, and homework should give each pupil guidance on how to improve, and each pupil must be given help and an opportunity to work on the improvement.

All these points make clear that there is no one simple way to improve formative assessment. What is common to them is that a teacher's approach should start by being realistic and confronting the question "Do I really know enough about the understanding of my pupils to be able to help each of them?"

Much of the work teachers must do to make good use of formative assessment can give rise to difficulties. Some pupils will resist attempts to change accustomed routines, for any such change is uncomfortable, and emphasis on the challenge to think for yourself (and not just to work harder) can be threatening to many. Pupils cannot be expected to believe in the value of changes for their learning before they have experienced the benefits of such changes. Moreover, many of the initiatives that are needed take more class time, particularly when a central purpose is to change the outlook on learning and the working methods of pupils. Thus teachers have to take risks in the belief that such investment of time will yield rewards in the future, while "delivery" and "coverage" with poor understanding are pointless and can even be harmful.

Teachers must deal with two basic issues that are the source of many of the problems associated with changing to a system of formative assessment. The first is the nature of each teacher's beliefs about learning. If the teacher assumes that knowledge is to be transmitted and learned, that understanding will develop later, and that clarity of exposition accompanied by rewards for patient reception are the essentials of good teaching, then formative assessment is hardly necessary. However, most teachers accept the wealth of evidence that this transmission model does not work, even when judged by its own criteria, and so are willing to make a commitment to teaching through interaction. Formative assessment is an essential component of such instruction. We do not mean to imply that individualized, one-on-one teaching is the only solution; rather we mean that what is needed is a classroom culture of questioning and deep thinking, in which pupils learn from shared discussions with teachers and peers. What emerges very clearly here is the indivisibility of instruction and formative assessment practices.

The other issue that can create problems for teachers who wish to adopt an interactive model of teaching and learning relates to the beliefs teachers hold about the potential of all their pupils for learning. To sharpen the contrast by overstating it, there is on the one hand the "fixed I.Q." view -- a belief that each pupil has a fixed, inherited intelligence that cannot be altered much by schooling. On the other hand, there is the "untapped potential" view -- a belief that starts from the assumption that so-called ability is a complex of skills that can be learned. Here, we argue for the underlying belief that all pupils can learn more effectively if one can clear away, by sensitive handling, the obstacles to learning, be they cognitive failures never diagnosed or damage to personal confidence or a combination of the two. Clearly the truth lies between these two extremes, but the evidence is that ways of managing formative assessment that work with the assumptions of

7

"untapped potential" do help all pupils to learn and can give particular help to those who have previously struggled.

Policy and Practice

Changing the policy perspective. The assumptions that drive national and state policies for assessment have to be called into question. The promotion of testing as an important component for establishing a competitive market in education can be very harmful. The more recent shifting of emphasis toward setting targets for all, with assessment providing a touchstone to help check pupils' attainments, is a more mature position. However, we would argue that there is a need now to move further, to focus on the inside of the "black box" and so to explore the potential of assessment to raise standards directly as an integral part of each pupil's learning work.

It follows from this view that several changes are needed. First, policy ought to start with a recognition that the prime locus for raising standards is the classroom, so that the overarching priority has to be the promotion and support of change within the classroom. Attempts to raise standards by reforming the inputs to and measuring the outputs from the black box of the classroom can be helpful, but they are not adequate on their own. Indeed, their helpfulness can be judged only in light of their effects in classrooms.

The evidence we have presented here establishes that a clearly productive way to start implementing a classroom-focused policy would be to improve formative assessment. This same evidence also establishes that in doing so we would not be concentrating on some minor aspect of the business of teaching and learning. Rather, we would be concentrating on several essential elements: the quality of teacher/pupil interactions, the stimulus and help for pupils to take active responsibility for their own learning, the particular help needed to move pupils out of the trap of "low achievement," and the development of the habits necessary for all students to become lifelong learners. Improvements in formative assessment, which are within the reach of all teachers, can contribute substantially to raising standards in all these ways.

Four steps to implementation. If we accept the argument outlined above, what needs to be done? The proposals outlined below do not follow directly

from our analysis of assessment research. They are consistent with its main findings, but they also call on more general sources for guidance.16

At one extreme, one might call for more research to find out how best to carry out such work; at the other, one might call for an immediate and large-scale program, with new guidelines that all teachers should put into practice. Neither of these alternatives is sensible: while the first is unnecessary because enough is known from the results of research, the second would be unjustified because not enough is known about classroom practicalities in the context of any one country's schools.

Thus the improvement of formative assessment cannot be a simple matter. There is no quick fix that can alter existing practice by promising rapid rewards. On the contrary, if the substantial rewards promised by the research evidence are to be secured, each teacher must find his or her own ways of incorporating the lessons and ideas set out above into his or her own patterns of classroom work and into the cultural norms and expectations of a particular school community.17 This process is a relatively slow one and takes place through sustained programs of professional development and support. This fact does not weaken the message here; indeed, it should be seen as a sign of its authenticity, for lasting and fundamental improvements in teaching and learning must take place in this way. A recent international study of innovation and change in education, encompassing 23 projects in 13 member countries of the Organization for Economic Co-operation and Development, has arrived at exactly the same conclusion with regard to effective policies for change.18 Such arguments lead us to propose a four-point scheme for teacher development.

1. Learning from development. Teachers will not take up ideas that sound attractive, no matter how extensive the research base, if the ideas are presented as general principles that leave the task of translating them into everyday practice entirely up to the teachers. Their classroom lives are too busy and too fragile for all but an outstanding few to undertake such work. What teachers need is a variety of living examples of implementation, as practiced by teachers with whom they can identify and from whom they can derive the confidence that they can do better. They need to see examples of what doing better means in practice.

So changing teachers' practice cannot begin with an extensive program of training for all; that could be justified only if it could be claimed that we have enough "trainers" who know what to do, which is certainly not the case. The essential first step is to set up a small number of local groups of schools -- some primary, some secondary, some inner-city, some from outer suburbs, some rural -- with each school committed both to a school-based development of formative assessment and to collaboration with other schools in its local group. In such a process, the teachers in their classrooms will be working out the answers to many of the practical questions that the evidence presented here cannot answer. They will be reformulating the issues, perhaps in relation to fundamental insights and certainly in terms that make sense to their peers in other classrooms. It is also essential to carry out such development in a range of subject areas, for the research in mathematics education is significantly different from that in language, which is different again from that in the creative arts.

The schools involved would need extra support in order to give their teachers time to plan the initiative in light of existing evidence, to reflect on their experience as it develops, and to offer advice about training others in the future. In addition, there would be a need for external evaluators to help the teachers with their development work and to collect evidence of its effectiveness. Video studies of classroom work would be essential for disseminating findings to others.

2. Dissemination. This dimension of the implementation would be in low gear at the outset -- offering schools no more than general encouragement and explanation of some of the relevant evidence that they might consider in light of their existing practices. Dissemination efforts would become more active as results and resources became available from the development program. Then strategies for wider dissemination -- for example, earmarking funds for inservice training programs -- would have to be pursued.

We must emphasize that this process will inevitably be a slow one. To repeat what we said above, if the substantial rewards promised by the evidence are to be secured, each teacher must find his or her own ways of incorporating the lessons and ideas that are set out above into his or her own patterns of classroom work. Even with optimum training and support, such a process will take time.

3. Reducing obstacles. All features in the education system that actually obstruct the development of effective formative assessment should be examined to see how their negative effects can be reduced. Consider the conclusions from a study of teachers of English in U.S. secondary schools.

Most of the teachers in this study were caught in conflicts among belief systems and institutional structures, agendas, and values. The point of friction among these conflicts was assessment, which was associated with very powerful feelings of being overwhelmed, and of insecurity, guilt, frustration, and anger. . . . This study suggests that assessment, as it occurs in schools, is far from a merely technical problem. Rather, it is deeply social and personal.[19]

The chief negative influence here is that of short external tests. Such tests can dominate teachers' work, and, insofar as they encourage drilling to produce right answers to short, out-of-context questions, they can lead teachers to act against their own better judgment about the best ways to develop the learning of their pupils. This is not to argue that all such tests are unhelpful. Indeed, they have an important role to play in securing public confidence in the accountability of schools. For the immediate future, what is needed in any development program for formative assessment is to study the interactions between these external tests and formative assessments to see how the models of assessment that external tests can provide could be made more helpful.

All teachers have to undertake some summative assessment. They must report to parents and produce end-of-year reports as classes are due to move on to new teachers. However, the task of assessing pupils summatively for external purposes is clearly different from the task of assessing ongoing work to monitor and improve progress. Some argue that these two roles are so different that they should be kept apart. We do not see how this can be done, given that teachers must have some share of responsibility for the former and must take the leading responsibility for the latter.[20] However, teachers clearly face difficult problems in reconciling their formative and summative roles, and confusion in teachers' minds between these roles can impede the improvement of practice. The arguments here could be taken much further to make the case that teachers should play a far greater

role in contributing to summative assessments for accountability. One strong reason for giving teachers a greater role is that they have access to the performance of their pupils in a variety of contexts and over extended periods of time.

This is an important advantage because sampling pupils' achievement by means of short exercises taken under the conditions of formal testing is fraught with dangers. It is now clear that performance in any task varies with the context in which it is presented. Thus some pupils who seem incompetent in tackling a problem under test conditions can look quite different in the more realistic conditions of an everyday encounter with an equivalent problem. Indeed, the conditions under which formal tests are taken threaten validity because they are quite unlike those of everyday performance. An outstanding example here is that collaborative work is very important in everyday life but is forbidden by current norms of formal testing.21 These points open up wider arguments about assessment systems as a whole -- arguments that are beyond the scope of this article.

4. Research. It is not difficult to set out a list of questions that would justify further research in this area. Although there are many and varied reports of successful innovations, they generally fail to give clear accounts of one or another of the important details. For example, they are often silent about the actual classroom methods used, the motivation and experience of the teachers, the nature of the tests used as measures of success, or the outlooks and expectations of the pupils involved.

However, while there is ample justification for proceeding with carefully formulated projects, we do not suggest that everyone else should wait for their conclusions. Enough is known to provide a basis for active development work, and some of the most important questions can be answered only through a program of practical implementation.

Directions for future research could include a study of the ways in which teachers understand and deal with the relationship between their formative and summative roles or a comparative study of the predictive validity of teachers' summative assessments versus external test results. Many more questions could be formulated, and it is important for future development that some of these problems be tackled by basic research. At the same time, experienced researchers would also have a vital role

to play in the evaluation of the development programs we have proposed.

Are We Serious About Raising Standards?

The findings summarized above and the program we have outlined have implications for a variety of responsible agencies. However, it is the responsibility of governments to take the lead. It would be premature and out of order for us to try to consider the relative roles in such an effort, although success would clearly depend on cooperation among government agencies, academic researchers, and school-based educators.

The main plank of our argument is that standards can be raised only by changes that are put into direct effect by teachers and pupils in classrooms. There is a body of firm evidence that formative assessment is an essential component of classroom work and that its development can raise standards of achievement. We know of no other way of raising standards for which such a strong prima facie case can be made. Our plea is that national and state policy makers will grasp this opportunity and take the lead in this direction.

1. James W. Stigler and James Hiebert, "Understanding and Improving Classroom Mathematics Instruction: An Overview of the TIMSS Video Study," Phi Delta Kappan, September 1997, pp. 19-20.
2. There is no internationally agreed-upon term here. "Classroom evaluation," "classroom assessment," "internal assessment," "instructional assessment," and "student assessment" have been used by different authors, and some of these terms have different meanings in different texts.
3. Paul Black and Dylan Wiliam, "Assessment and Classroom Learning," Assessment in Education, March 1998, pp. 7-74.
4. Lynn S. Fuchs and Douglas Fuchs, "Effects of Systematic Formative Evaluation: A Meta-Analysis," Exceptional Children, vol. 53, 1986, pp. 199-208.
5. See Albert E. Beaton et al., Mathematics Achievement in the Middle School Years (Boston: Boston College, 1996).
6. Lynn S. Fuchs et al., "Effects of Task-Focused Goals on Low-Achieving Students with and Without Learning Disabilities," American Educational Research Journal, vol. 34, 1997, pp. 513-43.
7. OFSTED (Office for Standards in Education), Subjects and Standards: Issues for School Development Arising from OFSTED Inspection Findings 1994-5: Key Stages 3 and 4 and Post-16 (London: Her Majesty's Stationery Office, 1996), p. 40.
8. Nicholas Daws and Birendra Singh, "Formative Assessment: To What Extent Is Its Potential to Enhance Pupils' Science Being Realized?," School Science Review, vol. 77, 1996, p. 99.
9. Clement Dassa, Jesús Vazquez-Abad, and Djavid Ajar, "Formative Assessment in a Classroom Setting: From Practice

to Computer Innovations," Alberta Journal of Educational
Research, vol. 39,
1993, p. 116.

10 1) Monty Neill, "Transforming Student Assessment," Phi
Delta Kappan, September 1997, pp. 35-36.

11 Task Group on Assessment and Testing: A Report
(London: Department of Education and Science and the Welsh
Office, 1988).

12 Richard Daugherty, National Curriculum Assessment: A
Review of Policy, 1987-1994 (London: Falmer Press, 1995).

13 Terry A. Russell, Anne Qualter, and Linda McGuigan,
"Reflections on the Implementation of National Curriculum
Science Policy for the 5-14 Age Range: Findings and
Interpretations from a
National Evaluation Study in England," International Journal of
Science Education, vol. 17, 1995, pp. 481-92.

14. Phillipe Perrenoud, "Towards a Pragmatic Approach to
Formative Evaluation," in Penelope Weston, ed., Assessment of
Pupils' Achievement: Motivation and School Success
(Amsterdam: Swets
and Zeitlinger, 1991), p. 92.

15. D. Royce Sadler, "Formative Assessment and the Design of
Instructional Systems," Instructional Science, vol. 18, 1989, pp.
119-44.

16. Paul J. Black and J. Myron Atkin, Changing the Subject:
Innovations in Science, Mathematics, and Technology
Education (London: Routledge for the Organisation for
Economic Co-operation
and Development, 1996); and Michael G. Fullan, with Suzanne
Stiegelbauer, The New Meaning of Educational Change
(London: Cassell, 1991).

17. See Stigler and Hiebert, pp. 19-20.

18. Black and Atkin, op. cit.

19. Peter Johnston et al., "Assessment of Teaching and
Learning in Literature-Based Classrooms," Teaching and
Teacher Education, vol. 11, 1995, p. 359.

20. Dylan Wiliam and Paul Black, "Meanings and
Consequences: A Basis for Distinguishing Formative and
Summative Functions of Assessment," British Educational
Research Journal, vol. 22,
1996, pp. 537-48.

21. These points are developed in some detail in Sam
Wineburg, "T. S. Eliot, Collaboration, and the Quandaries of
Assessment in a Rapidly Changing World," Phi Delta Kappan,
September 1997,
pp. 59-65.

From Formative Assessment to Assessment FOR Learning:
A Path to Success in Standards-Based Schools

As the mission of schools changes from ranking students to ensuring that all learn to specified standards, Mr. Stiggins argues that the purpose and form of assessments must change as well.

BY RICK STIGGINS

SOCIETY HAS SEEN fit to redefine the role of its schools. No longer are they to be places that merely sort and rank students according to their achievement. Now, they are to be places where all students become competent, where all students meet prespecified standards and so are not left behind. With increasing intensity, policy makers are turning to assessment as the power tool that will compel schools to fulfill this new role. If we look closely at the union of this redefined mission and the growing reliance on assessment, we can find a surprising and immensely powerful way to use assessment in the development of effective schools.

Traditionally, schools have used assessment — the pending final exam, the unannounced pop quiz, and the threat of low or failing report card grades — to motivate students. To maximize learning, our teachers believed, maximize anxiety. Assessment has served as the great intimidator. Pressure to get high test scores and good grades, it was believed, would motivate greater effort and thus more learning.

The recent change in the mission of schools has clouded this traditional view of the relationship between assessment and motivation. To see how and why, we must explore our assessment legacy and its motivational intricacies. As you will see, through that retrospective, we will discover a far more productive way for assessment to help students succeed.

THE OLD MISSION AND ITS LEGACY

Today's adults grew up in schools designed to sort us into the various segments of our social and economic system. The amount of time available to learn was fixed: one year per grade. The amount learned by the end of that time was free to vary: some of us learned a great deal; some, very little. As we advanced through the grades, those who had learned a great deal in previous grades continued to build on those foundations. Those who had failed to master the early prerequisites within the allotted time failed to learn that which followed. After 12 or 13 years of cumulative treatment of this kind, we were, in effect, spread along an achievement continuum that was ultimately reflected in each student's rank in class upon graduation.

RICK STIGGINS is the founder of Assessment Training Institute, Inc., Portland, Ore. The institute website can be accessed at www.assessmentinst.com. ©2005, Richard J. Stiggins.

From the very earliest grades, some students learned a great deal very quickly and consistently scored high on assessments. The emotional effect of this was to help them to see themselves as capable learners, and so these students became increasingly confident in school. That confidence gave them the inner emotional strength to take the risk of striving for more success because they believed that success was within their reach. Driven forward by this optimism, these students continued to try hard, and that effort continued to result in success for them. They became the academic and emotional winners. Notice that the trigger for their emotional strength and their learning success was their perception of their success on formal and informal assessments.

But there were other students who didn't fare so well. They scored very low on tests, beginning in the earliest grades. The emotional effect was to cause them to question their own capabilities as learners. They began to lose confidence, which, in turn, deprived them of the emotional reserves needed to continue to take risks. Pub-lic failure was embarrassing, and it seemed better not to try and thus to save face. As their motivation waned, of course, their performance plummeted. These students embarked on what they believed to be an irreversible slide toward inevitable failure and lost hope. Once again, the emotional trigger for their decision not to try was *their perception* of their performance on assessments.

Consider the reality — indeed, the paradox — of the schools in which we were reared. If some students worked hard and learned a lot, that was a positive result, and they would finish high in the rank order. But if some students gave up in hopeless failure, that was an acceptable result, too, because they would occupy places very low in the rank order. Their achievement results fed into the implicit mission of schools: the greater the spread of achievement among students, the more it reinforced the rank order. This is why, if some students gave up and stopped trying (even dropped out of school), that was regarded as the student's problem, not the teacher's or the school's. The school's responsibility was to pro-vide the opportunity to learn. If students didn't take advantage of the opportunity, that was fine within the system.

Once again, please notice who is using test results to decide whether to strive for excellence or give up in hopelessness. The "data-based decision makers" in this process are not teachers, not school leaders, and not policy makers. Rather, they are students themselves. Students are deciding whether success is within or beyond reach, whether the learning is worth the required effort, and so whether to try or not. The critical emotions underpinning the decision-making process include anxiety, fear of failure, uncertainty, and unwillingness to take risks — all triggered by students' perceptions of their own capabilities as reflected in assessment results.

Some students responded to the demands of such environments by working hard and learning a great deal. Others controlled their anxiety by giving up and not caring. The result for them? Exactly the opposite of the one society wants. Instead of leaving no child behind, these practices, in effect, drove down the achievement of at least as many students as they successfully elevated. And the evidence suggests that the downside victims are more frequently members of particular socioeconomic and ethnic minorities.

A NEW MISSION AND ITS EMOTIONAL PROMISE

In recent years, however, society has come to understand the limitations of schools that merely sort and rank students. We have discovered that students in the bottom one-third to one-half of the rank order — plus all who drop out before being ranked — fail to develop the foundational

reading, writing, and mathematical proficiencies needed to survive in, let alone contribute to, an increasingly technically complex and ethnically diverse culture. So today, in asking schools to leave no child behind, society is asking that educators raise up the bottom of the rank-order distribution to a specified level of competence. We call those expectations our "academic achievement standards." Every state has them, and, as a matter of public policy, schools are to be held accountable for making sure that *all students* meet them.

To be clear, the mission of sorting has not been eliminated from the schooling process. For the foreseeable future, students will still be ranked at the end of high school. However, society now dictates that such a celebration of differences in amount learned must start at a certain minimum level of achievement for all.

The implications of this change in mission for the role of assessment are profound. Assessment and grading procedures designed to permit only a few students to succeed (those at the top of the rank-order distribution) must now be revised to permit the possibility that all students could succeed at some appropriate level. Furthermore, procedures that permitted (perhaps even encouraged) some students to give up in hopelessness and to stop trying must now be replaced by others that promote hope and continuous effort. In short, the entire emotional environment surrounding the prospect of being evaluated must change, especially for perennial low achievers.

The students' mission is no longer merely to beat other students in the achievement race. At least part of their goal must be to become competent. Teachers must believe that all students can achieve a certain level of academic success, must bring all of their students to believe this of themselves,

must accommodate the fact that students learn at different rates by making use of differentiated instruction, and must guide all students toward the attainment of standards.

The driving dynamic force for students cannot merely be competition for an artificial scarcity of success. Because all students can and must succeed in meeting standards, cooperation and collaboration must come into play. The driving forces must be confidence, optimism, and persistence — for all, not just for some. All students must come to believe that they can succeed at learning if they try. They must have continuous access to evidence of what they believe to be credible academic success, however small. This new understanding has spawned increased interest in recent years in *formative assessment*.

FORMATIVE ASSESSMENT REVISITED: A KEY TO SUCCESS

Since 1967, when Michael Scriven articulated the distinction between summative and formative program evaluation, and since 1971, when Benjamin Bloom, Thomas Hastings, and George Madaus extended the differentiation to various forms of assessment, *summative* assessment has referred to tests administered after learning is supposed to have occurred to determine whether it did.[1] Meanwhile, *formative* assessment has been the label used for assessments conducted during learning to promote, not merely judge or grade, student success.

Clearly, over the decades, the interest (and investment) in summative assessment has far outstripped that accorded to formative assessment, as layer upon layer of tests have been used for classroom grading, as well as for local, state, national, and international accountability testing. Within the past few years, however, for-

mative assessment has emerged as an increasingly prominent tool for school improvement.

In its traditional form, formative assessment has been thought of as providing teachers with more frequent evidence of students' mastery of standards to help teachers make useful instructional decisions. In this way, formative assessment is intended to enhance student learning.

One reason for the recent resurgence of interest in formative assessment has been educators' realization that once-a-year summative standardized testing doesn't happen frequently enough to affect specific day-to-day, week-to-week, or even month-to-month instructional decisions. Besides, such testing fails to provide a sufficiently detailed picture of student learning to enable teachers to identify ways to help individual students. Typically, state accountability assessments include items covering many standards, and these are summed to yield a single overall proficiency score that is used to judge the sufficiency of student learning. These assessments tend not to provide evidence of each student's mastery of individual standards. Thus state summative test scores can inform accountability decisions but are not very helpful in guiding learning at the classroom level. So annual standardized tests have lacked sensitivity to instruction. Recently, attempts have emerged that are intended to overcome these inadequacies and make these large-scale assessments more practically useful.

Test more frequently. One approach that is beginning to emerge is to increase the frequency of summative assessments of standards from once to several times a year. Such evidence, it is argued, can give notice of instruction that is not working and so can inform programmatic changes that can increase the proportion of students

who meet standards. A few examples are short-cycle assessments, common assessments, benchmark tests, end-of-course examinations, and the quarterly or monthly formative standardized tests offered by some test publishers.

From a slightly different perspective, state departments of education embrace this approach when they release old state tests for local school practice exams. The largest publishers of standardized tests currently are using their immense banks of multiple-choice items to develop — and sell — new formative tests or computerized collections of test items that are aligned to state standards. The idea is that these will be purchased for more frequent local formative testing.

Those who adopt this practice see the benefit of using summative assessments in formative ways. They can identify state standards not yet being mastered by examinees early enough to permit teachers to make adjustments to promote greater success for their students. Similarly, they can identify students not progressing appropriately and can bring support services to bear. These are potent arguments in favor of this approach.

Manage data more effectively. A second trend in the emergence of formative assessment arises from the belief among some that the key to success resides not in the evidence gathered but in how that evidence is managed. Success in this camp is achieved by accumulating, summarizing, analyzing, and reporting assessment results with maximum efficiency. The more data-based the instructional decisions, advocates contend and research shows, the more effective will be instruction.

So local school districts and commercial software developers create and offer computer-based and online warehouse and management systems for handling student test scores. These systems are designed to deliver timely evidence of student progress into the hands of the right instructional decision makers. Typically, the assessment method used is multiple-choice tests generated from items in computerized banks that are aligned to standards. The result is a score that reflects student mastery of those standards. In this case, the intended users are teachers and school leaders working in teams to examine test-score trends, identify gaps in student learning, and translate test results into conclusions about program improvements.

Assessment FOR learning. A third approach to formative assessment contends that access to more frequent evidence of student mastery of state standards gathered using multiple-choice tests and placed in the hands of teachers, while potentially helpful, falls short of tapping the immense potential of formative thinking. The alternative is to use many different assessment methods to provide students, teachers, and parents with a continuing stream of evidence of student progress in mastering the knowledge and skills that underpin or lead up to state standards. This option has been labeled *assessment FOR learning.*

In this approach, students learn about achievement expectations from the beginning of the learning by studying models of strong and weak work. And they don't merely learn about the standards. Rather, they come to see and understand the scaffolding they will be climbing as they approach those standards. Students partner with their teacher to continuously monitor their current level of attainment in relation to agreed-upon expectations so they can set goals for what to learn next and thus play a role in managing their own progress. Students play a special role in communicating evidence of learning to one another, to their teacher, and to their families, and they do so not just after the learning has been completed but all along the journey to success. In short, during the learning, students are inside the assess-

ment process, watching themselves grow, feeling in control of their success, and believing that continued success is within reach if they keep trying.

When consistently carried out as a matter of routine within and across classrooms, this set of practices has been linked to achievement gains of one-half to two standard deviations on high-stakes tests, and the largest gains made are by low achievers.[2]

The most important difference between the first two formative assessment approaches described above and assessment FOR learning is that the former intend to inform the teachers about student achievement, while the latter also wants to inform students about their own learning. Assessment FOR learning rests on the understanding that students are data-based instructional decision makers too, a perspective all but ignored in our assessment legacy and in previous approaches to school improvement.

Another difference is that traditional formative thinking tends to want more frequent assessment of student mastery of the standards themselves, while assessment FOR learning focuses on day-to-day progress in learning as students climb the curricular scaffolding leading up to state standards. It tells users if and when students are attaining the foundations of knowledge, the reasoning, the performance skills, and the product development capabilities that underpin the mastery of essential standards.

In short, student success does not hinge merely on testing more frequently, on what teachers and principals do with the results, or on how efficiently the data are managed, although these things can contribute to student success. Rather, success also rests, at least in part, on what students do with and about those results. The actions students take — and there-

fore their ultimate success at learning — are determined by their emotional reaction to the assessment results. That response can be optimistic or pessimistic. An optimistic response leaves learners ready to keep trying and knowing what to do next: students maintain their desire to achieve and press on. A pessimistic response leaves learners feeling that the target remains beyond reach: students stop trying.

When used effectively, assessment FOR learning always triggers an optimistic response to assessment results from within the learner. It starts by providing students with a clear, student-friendly vision of the achievement target to be mastered, including models of strong and weak work. These examples reveal to learners where we want them to end up. Then the teacher provides learners with continuous access to descriptive feedback, which consists not merely of grades or scores but also of focused guidance specific to the learning target. Thus a foundation is laid for students to learn to self-assess and set goals. In this way, assessment FOR learning keeps students posted on where they are in relation to where they want be. By teaching students how to improve the quality of their work one dimension at a time and teaching them to monitor their own improvement over time, assessment FOR learning helps them close the gap between where they are now and where we want them to be.

But to use assessment productively to help achieve maximum student success, certain conditions need to be satisfied. Our achievement targets need to be clear. State standards need to be deconstructed into curriculum maps that are articulated within and across grade levels, and the resulting classroom-level achievement targets must be translated into student- and family-friendly versions. Furthermore, assessment and information manage-

ment systems must be created to meet the needs of all instructional decision makers, including students. All assessments — especially those created by classroom teachers — must be accurate, producing dependable evidence of learning in all contexts at all times. The timing and nature of student involvement in assessment, record-keeping, and communication must be effectively managed by teachers.

Obviously, this list includes assessment responsibilities that are different from what has been expected of teachers in the past. Very few teachers have been given the opportunity to learn to apply the principles of assessment FOR learning. But with proper professional development and support from school leaders, teachers can be provided with the opportunity to use the classroom assessment process and its results in ways that honor their professionalism and promote maximum student success.[3]

1. Michael Scriven, "The Methodology of Evaluation," in Ralph W. Tyler et al., eds., *Perspectives in Evaluation*, American Educational Research Association Monograph Series on Curriculum Evaluation, No. 1 (Chicago, Ill.: Rand McNally, 1967), pp. 39-83; and Benjamin S. Bloom, J. Thomas Hastings, and George F. Madaus, *Handbook of Formative and Summative Evaluation of Student Learning* (New York: McGraw-Hill, 1971).

2. Benjamin S. Bloom, "The Search for Methods of Group Instruction as Effective as One-to-One Tutoring," *Educational Leadership*, May 1984, pp. 4-17; Paul Black and Dylan Wiliam, "Assessment and Classroom Learning," *Educational Assessment: Principles, Policy, and Practice*, vol. 5, 1998, pp. 7-74; idem, "Inside the Black Box: Raising Standards Through Classroom Assessment," *Phi Delta Kappan*, October 1998, pp. 139-48; Samuel Meisels et al., "Creating a System of Accountability: The Impact of Instructional Assessment on Elementary Children's Achievement Scores," *Educational Policy Analysis Archives*, vol. 11, 2003, http://epaa.asu.edu/epaa/v11n9; and Michael C. Rodriguez, "The Role of Classroom Assessment in Student Performance on TIMSS," *Applied Measurement in Education*, vol. 17, 2004, pp. 1-24.

3. Richard J. Stiggins et al., *Classroom Assessment for Student Learning: Doing It Right — Using It Well* (Portland, Ore.: Assessment Training Institute, 2004).   **K**

File Name and Bibliographic Information

k0512sti.pdf

Rick Stiggins, From Formative Assessment to Assessment FOR Learning: A Path to Success in Standards-Based Schools, *Phi Delta Kappan*, Vol. 87, No. 04, December 2005, pp. 324-328.

Developmental Continuum Key 5—Involve Students How?

Skilled = I actively and consistently involve students in their own assessment, tracking progress, setting goals for learning, and communicating about their own progress. The following statements tend to describe me:

1. Many of my students can accurately describe the learning targets they are to hit. Vehicles include student-friendly language, rubrics, and samples of work that illustrate different levels of proficiency.
2. Many of my students are accurate assessors.
3. My students regularly track their learning.
4. My students regularly self-assess, set goals for learning, and develop a plan for achieving those goals.
5. My students regularly communicate with others about their learning. Vehicles include student-involved conferences, portfolio self-reflections, and letters to others.

Practiced = I can describe various student involvement activities and show examples. I am trying these out. The following statements tend to describe me:

1. I consistently and frequently explain to students the learning targets to be attained. Some of my students can accurately explain the targets in their own words.
2. I regularly share performance criteria, samples of student work, and assessment questions with students to help them understand the learning targets they are to hit and to help them be accurate assessors. Some students are accurate assessors.
3. I regularly ask my students to self-assess, reflect on their learning, track their progress, set goals for learning, and/or communicate their learning to others. I have used a variety of specific methods such as rubrics, self-reflection questions, portfolios, student writing, and answering practice test questions. But, my students are only partially successful.

Learning = I understand, in general, the types of things one might do to involve students in assessment, but I don't understand the precise steps involved. The following statements tend to describe me:

1. I understand that students need to understand the learning targets, but I am unsure how to do this.

2. I understand that students need to be able to accurately self-assess in order to take control of their learning and to realize associated achievement benefits, but I'm not sure how to begin.
3. I know that student involvement in their own assessment, record keeping, and reporting is important, but I don't know how to begin.

Ready to Learn = I don't understand what is meant by student involvement—or—I have tried it and it doesn't work—or—I don't believe it to be powerful. The following statements tend to describe me:

1. I'm not always sure if the target statements can be easily understood by all of my students.
2. My students exchange papers, mark questions right or wrong, and report total scores.
3. My students have difficulty explaining why they get the grades they do, self-assessing, and describing what quality works looks like.
4. I'm not sure students have the ability to assess themselves, and I'm not convinced that self-assessment is useful. I have not considered involving students in developing assessments.
5. I have students communicate progress to parents by sending work home and having parents sign off on it.

The Best Value in Formative Assessment

Ready-made benchmark tests cannot substitute for day-to-day formative assessment conducted by assessment-literate teachers.

Stephen Chappuis and Jan Chappuis

Recently a school leader asked us to provide an example of a good test item on a formative assessment and then show how that item would be different when used on a summative test. He wanted to explain to his staff the difference between formative and summative assessment. His end goal was for teachers to develop assessments to measure how well students were mastering the content standards that would appear on the state accountability test before the test was given in the spring.

His question reflects the confusion many educators have about formative and summative assessment. This confusion isn't surprising: Definitions of formative assessment abound, resulting in multiple and sometimes conflicting understandings. And in part because of these varying definitions and views, practices labeled as formative assessment in schools today vary widely.

One result of No Child Left Behind has been a surge in student testing—much of it voluntary, going well beyond what federal law or state assessment systems require. Many schools and districts administer tests with names like *benchmark, short-cycle,* and *interim assessments* to predict student performance on high-stakes tests and to identify students needing additional help. This increasingly popular level of testing has contributed to the widening scope of what is called formative assessment.
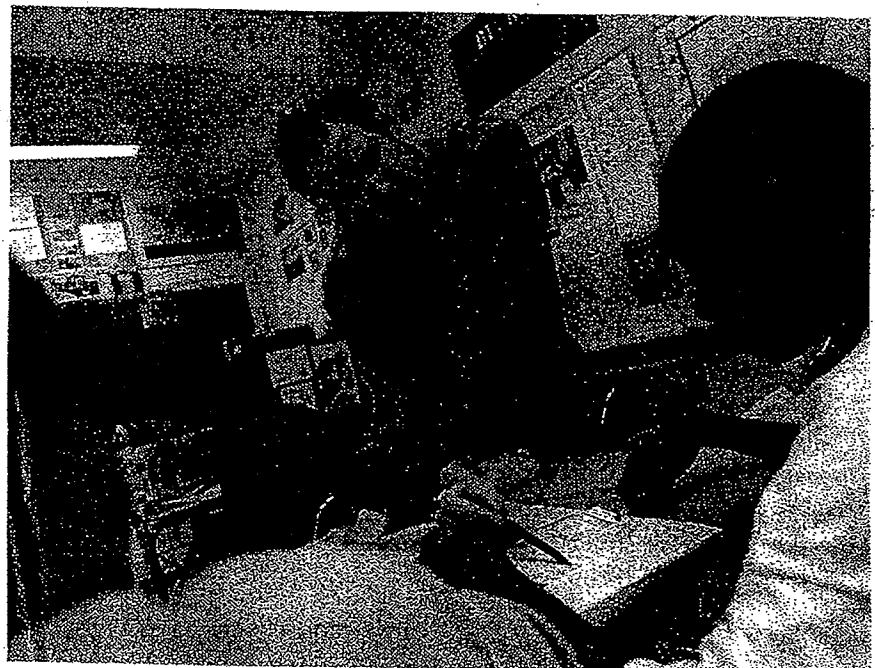
Testing companies in the K–12 education market, seeking to support the trend toward more testing, sometimes advertise products as "formative assessments." This adds to the confusion by encouraging the idea that it's the test itself that's formative (Chappuis, 2005).

In reality, this level of testing is often little more than a series of mini-summative tests, not always tightly

such as to determine what grade a student will receive on a classroom assignment, measure program effectiveness, or determine whether a school has made adequate yearly progress. Summative assessment, sometimes referred to as assessment *of* learning, typically documents how much learning has occurred at a point in time; its purpose is to measure the level of student, school, or program success.

Formative assessment is an ongoing, dynamic process that involves far more than frequent testing.

Formative assessment, on the other hand, delivers information *during* the instructional process, *before* the summative assessment. Both the teacher and the student use formative assessment results to make decisions about what actions to take to promote further learning. It is an ongoing, dynamic process that involves far more than frequent testing, and measurement of student learning is just one of its components.

Summative Assessment Used in Formative Ways

Almost any assessment instrument can be used for summative or formative purposes, but some, by design, are better suited to summative use and others to formative use. For example, state assessments, although they may also have some limited formative use,

dressed to what was taught in the classroom. There is nothing inherently formative in tests; they may or may not be used to make changes in teaching that will lead to greater student learning.

The Difference Between Summative and Formative

What is formative assessment, then? It is a process, not a product. That was the central misunderstanding of the administrator who asked for an example of a good formative test item. Even though assessments will continue to be labeled *formative* or *summative*, how the results are used is what determines whether the assessment is formative or summative.

To begin, let's look at summative assessment. In general, its results are used to make some sort of judgment,

© STEFANIE FELIX

dards and to predict future performance on large-scale summative tests. A common misconception is that this level of assessment is automatically formative. Although such assessments are sometimes intended for formative use—that is, to guide further instruction for groups or individual students—teachers' and administrators' lack of understanding of how to use the results can derail this intention. The assessments will produce no formative benefits if teachers administer them, report the results, and then continue with instruction as previously planned—as can easily happen when teachers are expected to cover a hefty amount of content in a given time.

Teachers also select or develop their own summative assessments—those that count for a grade. Compared with state and district tests, these classroom assessments can more readily be adapted to formative use because their results are more immediately available and their learning targets have been more recently taught. When teachers know what specific learning target each question or task on their test measures, they can use the results to select and reteach portions of the curriculum that students haven't yet mastered. Carefully designed common assessments can be used this way as well.

Students, too, can use summative test results to make decisions about further study. If the assessment items are explicitly matched to the intended learning targets, teachers can guide students in examining their right and wrong answers in order to answer questions such as these:

■ What are my strengths relative to the standards?

■ What have I seen myself improve at?

■ Where are my areas of weakness?

■ Where didn't I perform as desired, and how might I make those answers better?

are designed to provide accountability data and to compare schools and districts. Because their primary purpose is summative, the results may not be communicated in ways that teachers and students can easily interpret and work with. Further, the results are often delivered months after the administration of the tests. For these reasons, such state tests usually do not function well in a formative way: They can't contribute much information to guide day-to-day instruction or help determine the next learning steps of individual students.

Benchmark assessments, either purchased by the district from commercial vendors or developed locally, are generally meant to measure progress toward state or district content stan-

■ What do these results mean for the next steps in my learning, and how should I prepare for that improvement?

For students to make maximum use of these questions to guide further study, however, teachers must plan and allow time for students to learn the knowledge and skills they missed on the summative assessment and to retake the assessment. Lack of time for such learning is one of the biggest hindrances to formatively using summative classroom assessments.

Assessment *for* Learning

When teachers assess student learning for purely formative purposes, there is no final mark on the paper and no summative grade in the grade book. Rather, assessment serves as practice for students, just like a meaningful homework assignment does. This is formative assessment at its most valuable. Called assessment *for* learning, it supports learning in two ways:

■ Teachers can adapt instruction on the basis of evidence, making changes and improvements that will yield immediate benefits to student learning.

■ Students can use evidence of their current progress to actively manage and adjust their own learning. (Stiggins, Arter, Chappuis, & Chappuis, 2006)

Assessment for learning can take many different forms in the classroom. It consists of anything teachers do to help students answer three questions (Atkin, Black, & Coffey, 2001):

Where am I going?
■ Give students a list of the learning targets they are responsible for mastering, written in student-friendly language.

■ Show students anonymous strong and weak examples of the kind of product or performance they are expected to create and have them use a scoring guide to determine which one is better and why.

Where am I now?
■ Administer a nongraded quiz partway through the learning, to help both teacher and students understand who needs to work on what.

■ Highlight phrases on a scoring guide reflecting specific strengths and areas for improvement and staple it to student work.

■ Have students identify their own strengths and areas for improvement using a scoring guide.

■ Have students keep a list of learning targets for the course and periodically check off the ones they have mastered.

How can I close the gap?
■ Give students feedback and have them use it to set goals.

■ Have students graph or describe their progress on specific learning targets.

■ Ask students to comment on their progress: What changes have they noticed? What is easy that used to be hard? What insights into themselves as learners have they discovered?

When students use feedback from the teacher to learn how to self-assess and set goals, they increase ownership of their own success. In this type of assessment environment, teachers and students collaborate in an ongoing process using assessment information to improve rather than judge learning. It all hinges on the assessment's ability to provide timely, understandable, and descriptive feedback to teachers and students.

The greatest value in formative assessment lies in teachers and students making use of results to improve real-time teaching and learning at every turn.
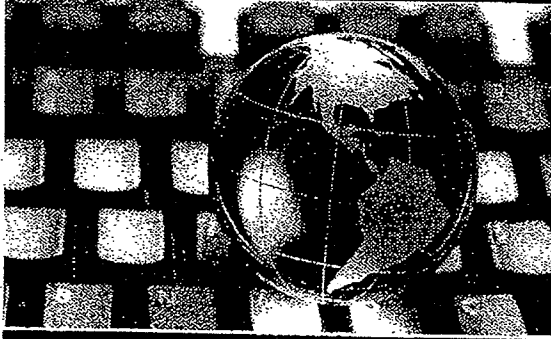
Feedback: The Key Difference

Feedback in an assessment *for* learning context occurs while there is still time to take action. It functions as a global positioning system, offering descriptive information about the work, product, or performance relative to the intended learning goals. It avoids marks or comments that judge the level of achievement or imply that the learning journey is over.

Effective descriptive feedback focuses on the intended learning, identifies specific strengths, points to areas needing improvement, suggests a route of action students can take to close the gap between where they are now and where they need to be, takes into account the amount of corrective feedback the learner can act on at one time, and models the kind of thinking students will engage in when they self-assess. These are a few examples of descriptive feedback:

■ You have interpreted the bars on this graph correctly, but you need to make sure the marks on the x and y axes are placed at equal intervals.

■ What you have written is a hypothesis because it is a proposed explanation. You can improve it by writing it as an "if . . . then. . ." statement.

■ The good stories we have been reading have a beginning, a middle, and an end. I see that your story has a beginning and a middle, just like those good stories do. Can you draw and write an ending?

■ You have described the similarities between _____ and _____ clearly in

this paper, and you have identified key differences. Work on illustrating those differences with concrete examples from the text.

In contrast, the feedback from a summative assessment—whether given in the classroom or in a larger context—tells teachers and students who made it to the learning destination and who didn't. The assessment's coded, evaluative feedback—*B+, 84%, Meets Standards, Great Job, Proficient*, and so on—does not identify individual student strengths and areas needing improvement. It does not offer specific information for course correction.

Advantages of Formative Classroom Assessment

Although all formative assessment practices have the potential to increase student learning, assessment for learning in the classroom offers a number of distinct benefits:

- The timeliness of results enables teachers to adjust instruction quickly, while learning is in progress.
- The students who are assessed are the ones who benefit from the adjustments.
- The students can use the results to adjust and improve their own learning.

When we try to teacher-proof the assessment process by providing a steady diet of ready-made external tests, we lose these advantages. Such tests cannot substitute for the day-to-day level of formative assessment that only assessment-literate teachers are able to conduct. The greatest value in formative assessment lies in teachers and students making use of results to improve real-time teaching and learning at every turn. ◼

References
Atkin, J. M., Black, P., & Coffey, J. (2001). *Classroom assessment and the national science standards*. Washington, DC: National Academies Press.
Chappuis, S. (2005). Is formative assessment losing its meaning? *Education Week, 24*(44), 38.
Stiggins, R., Arter, J., Chappuis, J., & Chappuis, S. (2006). *Classroom assessment for student learning: Doing it right—using it well*. Portland, OR: Educational Testing Service.

Stephen Chappuis (schappuis@ets.org) and **Jan Chappuis** (jchappuis@ets.org) work with the ETS Assessment Training Institute in Portland, Oregon (www.ets.org/ati).

Third Grade
Unit 12 Multiplication

Student Packet
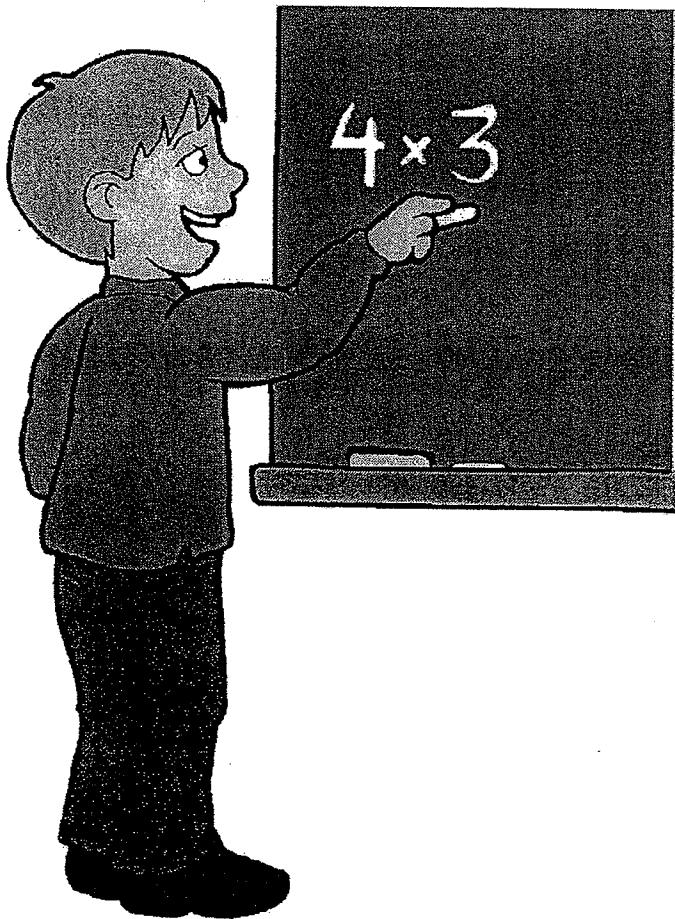
Multiplication Table

Columns

X	0	1	2	3	4	5	6	7	8	9	10
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Rows
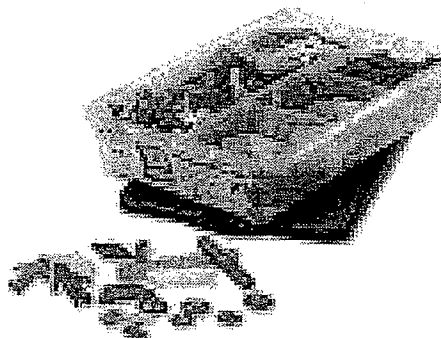
1. I can explain that the order of the numbers I multiply doesn't matter. For example: 5x6 = 6x5.							
Keep track of how you are doing. Write the date in the box and color Red, Yellow or Green							
1st Try	2nd Try	3rd Try	4th Try	5th Try	6th Try	7th Try	Final Try

1. Try a few different problems and show that this is true.

7 x 5 = 12 and 5 x 7 = 12   that means that 7 x 5 = 5 x 7, the order does not matter.

8 x 3 = 11 and 3 x 8 = 11   that means that 8 x 3 = 3 x 8 , the order does not matter.

Try one of your own:

____ x _____ and ____ x ____ = ____ , that means that ____ x ____ = ____ x ____

Neat Vocabulary Link:

Do any of your parents commute to work? The word commute means to travel. Since the numbers in multiplication and addition can travel, but it does not change the answer, this is called the **commutative property**.

Above and Beyond:

Does the commutative property work for subtraction? Can you move the numbers and still get the same answer? Try some examples and see.

2. I can explain why any number multiplied by 1 equals that number. For example: 7 x 1 = 7 and 345 x 1 = 345

Keep track of how you are doing. Write the date in the box and color Red, Yellow or Green							
1st Try	2nd Try	3rd Try	4th Try	5th Try	6th Try	7th Try	Final Try

Below are some good explanations by students.

Any number x 1 = the number because there is only one group of the number.

Example: 3x1 =
1x3

The reason why any number x 1 is equal to that number is because you only have one group of that much.

For example
2x1=2

① Because you have to count the number one time and you get that answer. For exsample 3x1=3 because you count 3 one time and you get 3.

3. I can explain why any number multiplied by zero equals zero. For example 8 x 0 = 0 and 97 x 0 = 0

Keep track of how you are doing. Write the date in the box and color Red, Yellow or Green							
1st Try	2nd Try	3rd Try	4th Try	5th Try	6th Try	7th Try	Final Try

Below are some good explanations by students.

Any number x zero equals zero is because you don't have any groups thats why it equals zero.

any number x 0 = 0 because theres only zero groups.

## 4. I can multiply single digit numbers.

Keep track of how you are doing. Write the date in the box and color Red, Yellow or Green.

| 1st Try	2nd Try	3rd Try	4th Try	5th Try	6th Try	7th Try	Final Try

You need to memorize all of the multiplication facts in this table up to 10 x 10. Do you think you can answer at least 30 of them in a minute? Do you think you can do the bonus ones too?

Color below in green each box that you know by heart quickly.

MY MULTIPLICATION CHART

Name:_____

X	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

Everyone Needs to Learn — Bonus ☺

Everyone Needs to Learn — Bonus ☺

When You are sure you know a fact, color the box in Green!

5. I can use the lattice and traditional methods to multiply numbers up to 12 x 12.							
Keep track of how you are doing. Write the date in the box and color Red, Yellow or Green							
1st Try	2nd Try	3rd Try	4th Try	5th Try	6th Try	7th Try	Final Try

LATTICE METHOD

How to do the lattice method for 7 x 12

Step 1. Draw your lattice and put the numbers on top and to the right side.
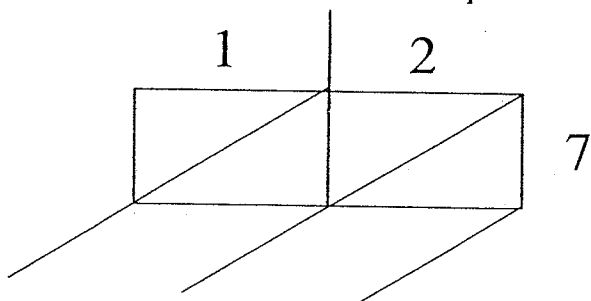
Step 2. Multiply each digit on the top by each digit on the right side and put the answer in the spot that lines up with the 2 digits. Always put the ones digit furthest to the right!

$1 \times 7 = 7$
Put a 0 in the empty space

$2 \times 7 = 14$
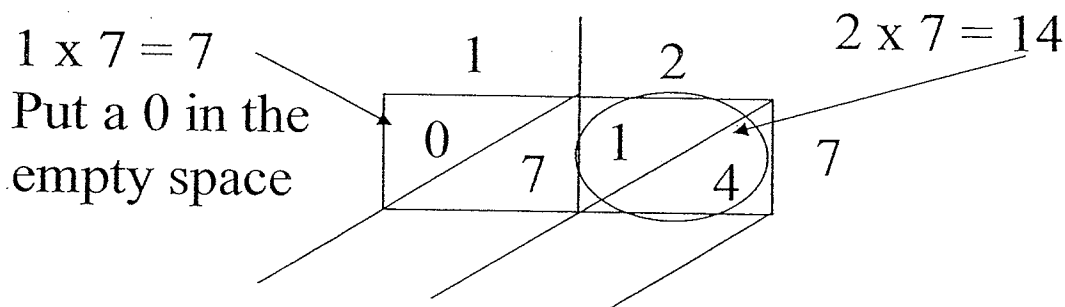
Step 3. Add the digits along the diagonal lines. Start at the right side and work toward the left side. If any number adds to bigger than 9, carry the digit over to the next diagonal.

$1 \times 7 = 7$
Put a 0 in the empty space

$2 \times 7 = 14$
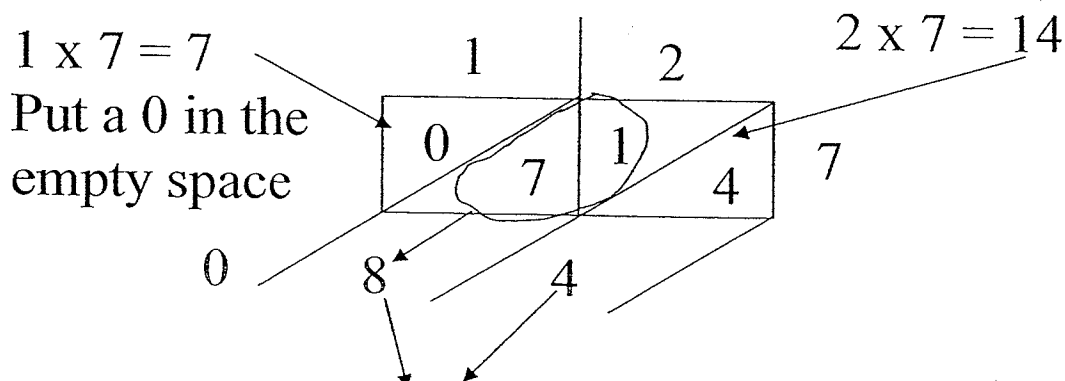
The answer is 84

How to do the lattice method for 11 x 12
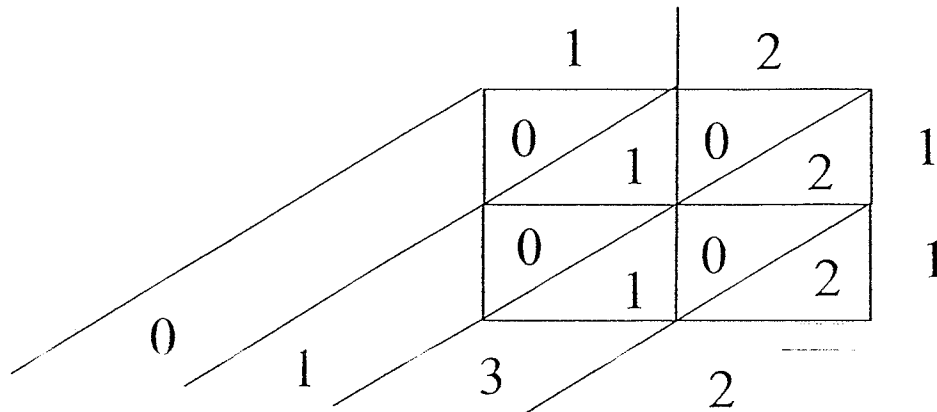
The answer is 132

How to do the lattice method for 15 x 17
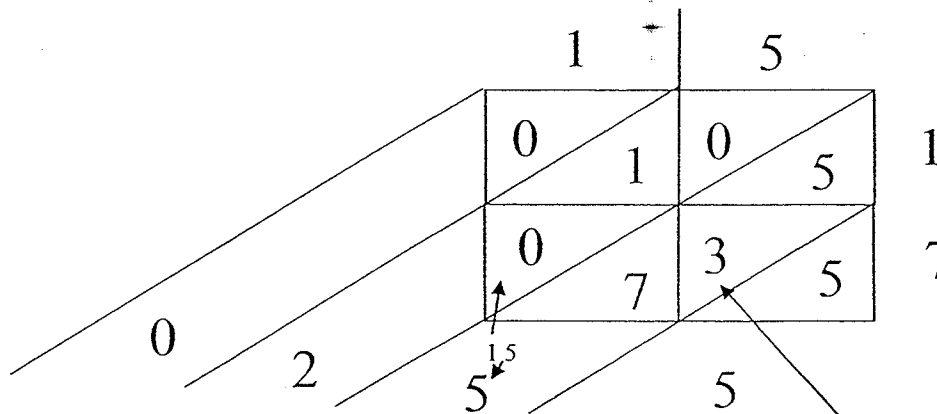
7 + 3 + 5 = 15. Carry the 1 to the next diagonal.

The answer is 255

TRADITIONAL METHOD

How to do the traditional method for 7 x 12

Step 1. write your problem like in addition problems with the bigger number on top.

$$
\begin{array}{r}
12 \\
\times\ 7 \\
\hline
\end{array}
$$

Step 2. Multiply the numbers in the right column and place the answer just below the line.

$$
\begin{array}{r}
1\boxed{2} \\
\times\ \boxed{7} \\
\hline
\boxed{1\ 4}
\end{array}
\qquad 2 \times 7 = \boxed{14}
$$

Step 3. Put a zero just below the ones place.

$$
\begin{array}{r}
12 \\
\times\ 7 \\
\hline
1\ 4 \\
\boxed{0}
\end{array}
$$

Step 4. Multiply the next digit in the top number by the bottom number.

$$
\begin{array}{r}
12 \\
\times\ 7 \\
\hline
1\ 4 \\
\boxed{7}0
\end{array}
\qquad 1 \times 7 = \boxed{7}
$$

Step 5. Add the numbers.

$$
\begin{array}{r}
12 \\
\times\ 7 \\
\hline
1\ 4 \\
+\ 70 \\
\hline
84
\end{array}
$$

6. I can use strategies like arrays, doubling and patterns to multiply numbers.

Keep track of how you are doing. Write the date in the box and color Red, Yellow or Green							
1st Try	2nd Try	3rd Try	4th Try	5th Try	6th Try	7th Try	Final Try

Arrays

$$3 \times 4 = 12$$

4

$3 \left\{ \begin{array}{cccc} X & X & X & X \\ X & X & X & X \\ X & X & X & X \end{array} \right.$ ← 12 X's

$$4 \times 5 = 20$$

4

$5 \left\{ \begin{array}{cccc} \bullet & \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet & \bullet \end{array} \right.$ ← 20 Dots

Doubling

Any time you are multiplying by 2 you can thing of having 2 groups. For example, if you wanted to find out how many legs 2 spiders have you could draw 2 spiders and count the legs –you should get 16 legs (creepy).
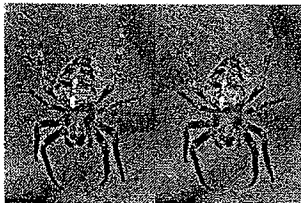
$$2 \times 8 = 16$$

Patterns

You can use skip counting to multiply.

To find the answer to 3 x 7 you can skip count by 3, seven times:

3   6   9   12   15   18   21 $3 \times 7 = 21$

Skip count by 3, seven times

To find the answer to 5 x 87 you can skip count by 5, eight times:

5   10   15   20   25   30   35   40 $5 \times 8 = 21$

Skip count by 5, eight times

7. I can decide when to multiply to solve word problems.

Keep track of how you are doing. Write the date in the box and color Red, Yellow or Green

1st Try	2nd Try	3rd Try	4th Try	5th Try	6th Try	7th Try	Final Try

Try to Draw a picture:

4   Jessica buys 3 bunches of bananas. There are 6 bananas in each bunch. What is the total number of bananas Jessica buys?

A   2

B   9

C   18

D   24

Draw 3 bunches of bananas and make sure each bunch has 6 in it. Count up all of the bananas.

3 x 6 = 18 bananas (I hope you are hungry).

7   Lee brings 6 boxes of cookies to Juan's party. There are 9 cookies in each box. What is the total number of cookies Lee brings to the party?

A   15

B   48

C   54

D   56
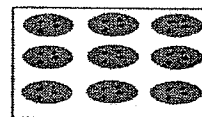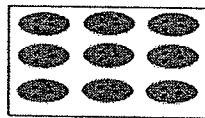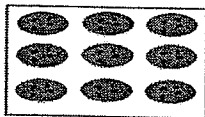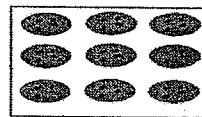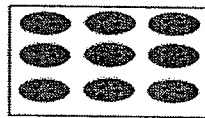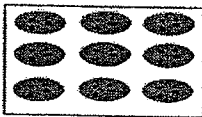
Draw 6 boxes of cookies with 9 cookies in each box. Count up all of the cookies.

6 x 9 = 54 Cookies

Sometimes, the hardest part about word problems is figuring out what operation to use. Below are some key words that can help you when reading a word problem.

Addition	increased by more than combined, together total of sum added to
Subtraction	decreased by minus, less difference between/of less than, fewer than

Multiplication	of
	groups, Packages, Bunches, Boxes, Containers of, etc…
	times, multiplied by
	product of
	increased/decreased by a
	   factor of (this type can
	   involve both addition or
	   subtraction *and*
	   multiplication!)

Division	per, a out of ratio of, quotient of percent (divide by 100)
Equals	is, are, was, were, will be gives, yields sold for

Third Grade Fractions Unit

Student Packet
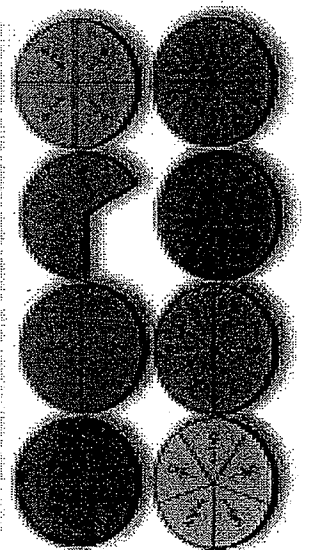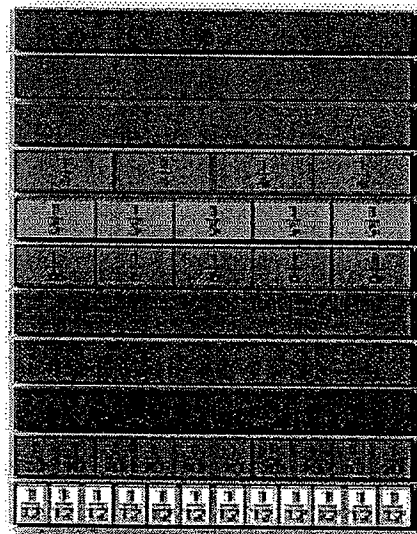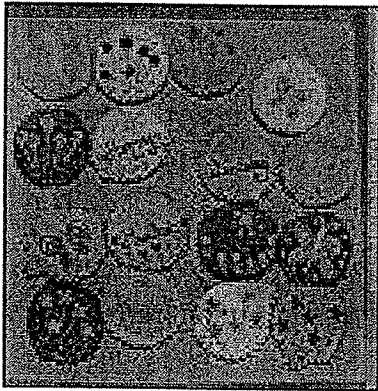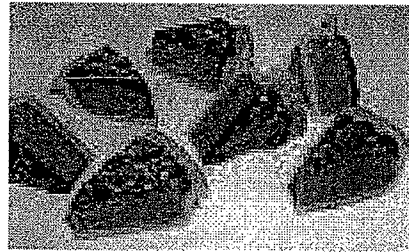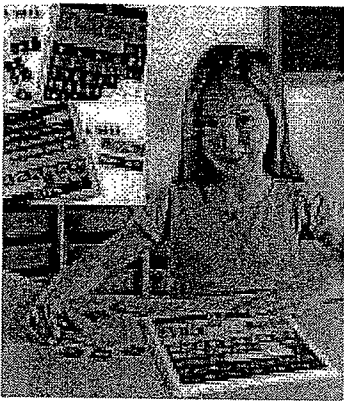
1. Draw a picture showing something broken into ½.

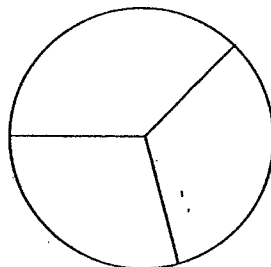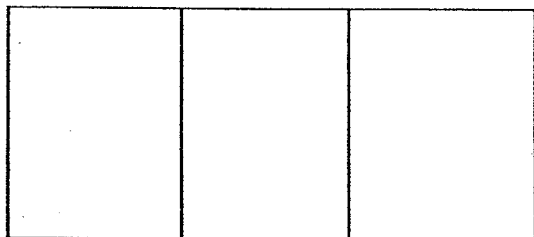Good Answers. Both objects are broken into 2 <u>equal</u> parts.

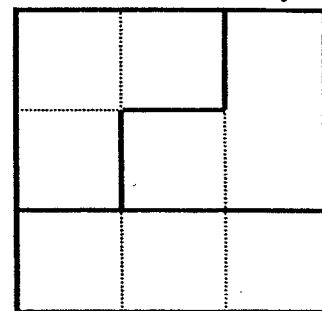Wrong Answers (It is broken into 2 parts but each part is not the same size.

2. Draw a picture showing something broken into 1/3.
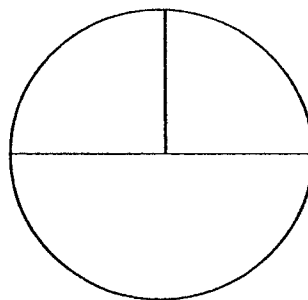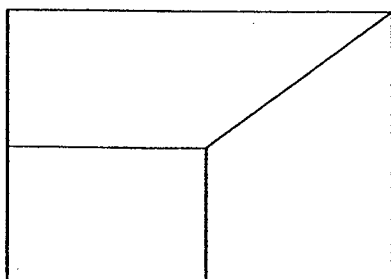
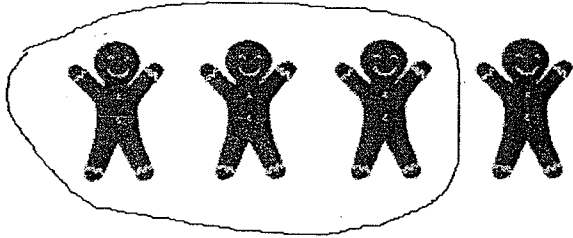Good Answers. Both objects are broken into 3 <u>equal</u> parts.   Wow – This is a tricky one

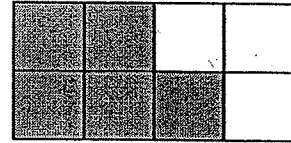Wrong Answers (It is broken into 3 parts but each part is not the same size.

I can show a fraction like 1/2, 2/3, 3/7 by drawing a picture or using colored tiles (Pictures are fun).
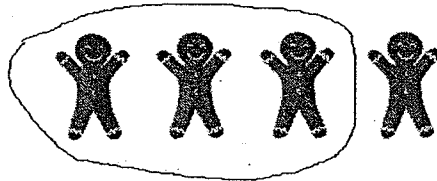
Good Answers

I have circled ¾ of the cookies.

The grey tiles are 5/8 of the tiles.

I can explain what the top and bottom numbers in a fraction mean and tell which one is the numerator and which one is the denominator (Those are cool names).

For the cookie picture shown:

$$\frac{3}{4}$$

3 is the Top number and is called the Numerator = Number of cookies I have.

4 is the Bottom number and is called the Denominator = Total number of cookies

I can show something broken into lots of equal parts and write a fraction for it – like cutting an apple pie into 4 equal pieces called 1/4 of the pie – yum)
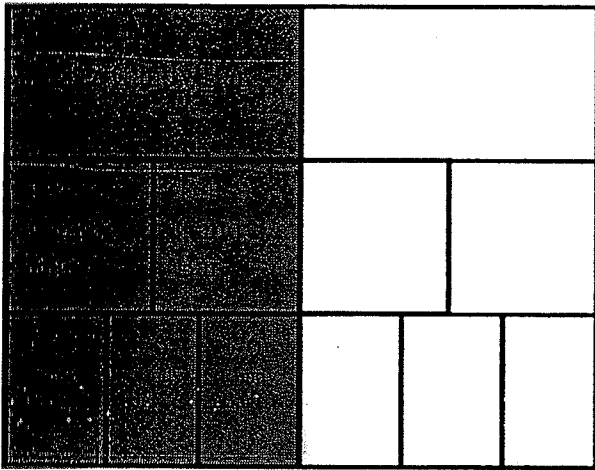
Each piece of this cherry pie is 1/6 of the pie.
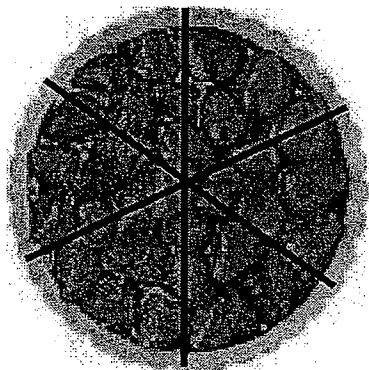
The circled cupcakes represent 3/5 of the cupcakes
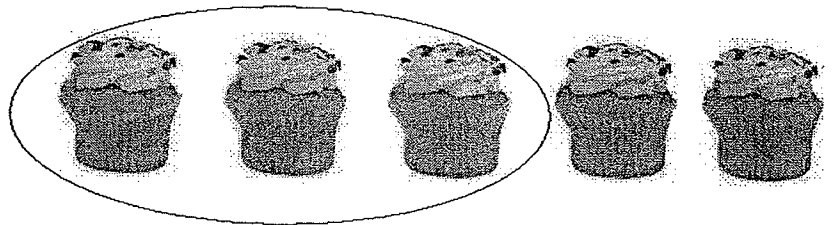
What would you rather have?

$$\frac{1}{2}$$

$$\frac{2}{4}$$

$$\frac{3}{6}$$

They are all the same so your tummy would be happy with any of them.
They are called Equivalent Fractions.

A unit fraction is a fraction that shows one piece of a whole. A unit fraction has a 1 in the top of the fraction that is called the numerator of the fraction.

Examples of unit fractions – All have 1 as the Numerator (Top part).

$$\frac{1}{2} \qquad \frac{1}{3} \qquad \frac{1}{5} \qquad \frac{1}{6} \qquad \frac{1}{7}$$

When ordering unit fractions the bigger unit fraction is the one with the smallest number in the denominator (bottom). Think about it, what would you rather have, ½ of a pie or ¼ of a pie (Most people would want ½ a pie because it is bigger.

Smallest   Biggest
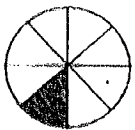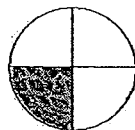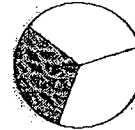
$$\frac{1}{8} \qquad\qquad\qquad \frac{1}{4} \qquad\qquad\qquad \frac{1}{3} \qquad\qquad\qquad \frac{1}{2}$$
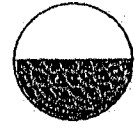
Putting Unit Fractions on a Number Line

1 Whole							
1/2							
1/3							
1/4							
1/5							
1/6							
1/8							

0    $\frac{1}{8}$ $\frac{1}{6}$ $\frac{1}{5}$ $\frac{1}{4}$ $\frac{1}{3}$ $\frac{1}{2}$ 1

AFL Class Tracking Sheet

● I still need help but will get it!   ○ I am close   ◉ I know it well - bring on the test!

MATH UNIT 10 Fractions Date →	1. I can explain that a fraction is a part of something and give examples of fractions that are part of a whole thing (Like ½ of a pie) or part of a group.	2. I can show a fraction like ¼, 1/3, 2/3, 3/7 by drawing a picture of using colored tiles.	3. I can explain what the top and bottom numbers in a fraction mean and tell which one is the numerator and the denominator.	4. I can show something broken into lots of equal parts and write a fraction for it- like cutting and apple pie into 4 equal pieces called ¼ of the pie.	5. I can explain what a unit fraction is and I can write them in order from smallest to biggest and put them in the right spot on a number line.	6. I can use drawings or number tiles to show how some fractions like ½ and 2/4 are the same thing. I can find equivalent fractions when given several to choose from.
Abdulla, Fatima						
Anna, Lance						
BallardDupree, Nia						
Black, Tapainga						
Christy, Mieyanna						
Cordovez, Jose						
Diaz, Gialynn						
DiMarco, Jenna						
Drescher, Kyle						
Erckert, Daniel						
Garcia, Paul						
Harris, Leah						
Johnson, LaMiyay						
Krehan, Caitlin						
Kress, Cierra						
Laufenberg, Peyton						
McClain, Amonti						
Mingo, Kayvon						
Morford, Gabrielle						
Noble, Randi						
Perez, Evani						
Samek, Austin						
Shpakovsky, Deanna						
Stone, Dennison						
Tallchief, Chyna						
Triplette, DZare						
Washington, Halle						
Wells, Adrian						

• Just one way teachers can check student tracking

Name:_____

I know I am on _____ with this

skill because_____

_____

_____

_____.

Name:_____

I know I am on _____ with this

skill because_____

_____

_____

_____.