Embedded Formative Assessment
By Dylan Wiliam (Solution Tree Press, 2011)

S.O.S.   (A Summary of the Summary)

The main ideas of the book are:

~ Research shows that formative assessment has a large impact on student learning.
~ This book provides examples of this research as well as practical formative assessment strategies all K-12 teachers can implement.

Why I chose this book:
I was excited to read a book written by Dylan Wiliam. I think of him as one of the founders of the formative assessment movement. He wrote the original 1998 article, along with Paul Black, "Inside the Black Box: Raising Standards Through Classroom Assessment." It was this article that showed educators the tremendous impact formative assessment could have on student learning. Wiliam and Black identified 600 studies related to formative assessment and concluded that when teachers *used assessment to inform instruction* their students made almost *twice as much progress*!

I also like that this book combines research with practical strategies. Wiliam has been a teacher himself and he includes practical strategies that K-12 teachers can embed into any lesson on any topic.

Because formative assessment strategies work in every grade and every subject, you could make formative assessment a focus of your professional development and bring together all of your teachers.

I have other materials on formative assessment in addition: a summary of *another* great book on formative assessment, *Classroom Assessment* for *Student Learning,* by Rick Stiggins and colleagues; a 90-minute formative assessment workshop on my website; plus more formative assessment workshop ideas at the end of this summary as well.

NOTE: This may be a good summary to pass along to your math and science chairs. Dylan Wiliam was a math and science teacher and he goes into many math and science examples to illustrate his points that are not included in this summary.

Chapter 1 – Why Educational Achievement Matters

Educational achievement is more important than ever. The gap between the salaries of high school dropouts and those with professional degrees continues to widen. Furthermore, the jobs of the future are changing. The United States sheds approximately 2,500 low-skill jobs *every day*. Even high skill jobs are at risk as well. Education has never been more important – not simply to teach new skills, but to teach students the ability to develop new skills.

Why Is Raising Student Achievement So Hard?

Although governments have understood that student achievement is important, the vast majority of policy initiatives aimed at increasing student achievement have failed. Without going into great detail, what follows are some of the types of reforms that have been implemented: changing the *structures* of schools (such as making schools smaller), changing the *governance* of schools (such as charter schools), changing the *curriculum* schools use, changing the *textbooks*, and upgrading *technology*. However, none of these changes worked because these initiatives were aimed in the wrong direction. None of them aimed to improve *teacher quality*.

In 1996, William Sanders and June Rivers conducted a famous study in which they looked at the achievement records of all 3 million second to eighth grade students in Tennessee to determine the impact on their learning of having different teachers. Their findings were astonishing. A student who started at the 50th percentile who was assigned to a "high-performing" teacher for three years in a row would end up at the 90th percentile. However, if that same student had been assigned to "low-performing" teachers for three years, that student would end up at the 37th percentile. This proved how important teacher quality is in improving student achievement.

How Do We Increase Teacher Quality?

Even if we know that *teacher quality* is the single most important factor in improving student achievement, how do we increase it? While some policy initiatives have focused on removing ineffective teachers or attracting more qualified people to the profession, both of these options are slow and have small effects on student achievement. Instead, we need a method to improve the quality of those teachers already working in our schools.

Chapter 2 – The Case for Formative Assessment

Although we have known that to increase student achievement we need to improve teacher quality, we have gone about trying to improve teacher quality by focusing professional development on areas that have *not* been backed by research. For example, some of the more popular areas that professional development has focused on include improving teachers' ability to teach to different learning styles, learning how to apply what we know about the brain to improve teaching, and expanding teachers' content knowledge to improve their teaching. The research shows that all three of these areas have shown very disappointing results. However, there is a body of research that shows a *large* impact on student achievement across different subjects, different age groups, and even different countries – and that research is on *formative assessment*.

The History of the Research on Formative Assessment

While the term *formative evaluation* was first used in 1967 by Michael Scriven, it was Benjamin Bloom who first used it to distinguish it from the role classroom *summative* tests play:

"Quite in contrast is the use of "formative evaluation" to provide feedback and correctives at each stage in the teaching-learning process. By formative evaluation we mean evaluation by brief tests used by teachers and students as aids in the learning process."

Bloom believed that this type of evaluation could have much *more highly beneficial effects* on the learning of students and the instruction of teachers, and the research on formative assessment proved this to be true. Although the term *formative* was rarely used in the twenty years after the Bloom quotation above, the research done on formative assessment in the 1980s and 1990s, including research completed by Dylan Wiliam and Paul Black, showed the powerful impact it has on student achievement. In 1998, Wiliam and Black identified 600 relevant studies and concluded that the use of assessment to inform instruction, particularly at the classroom level, in many cases, effectively *doubled the speed of student learning*. After combing through the literature they conducted an experiment on their own and again they found that the teachers who used the formative assessment techniques made almost *twice as much progress* over the year.

What IS Formative Assessment

The basic idea behind formative assessment is that evidence of student learning is used to adjust instruction to better meet students' learning needs – in other words, teaching is adaptive to student needs. In the same way that *formative* experiences are those experiences that have shaped our current selves, *formative* assessments should shape instruction. There are *many* ways that assessments can shape instruction. Below are a few examples:

• Each year a group of Algebra I teachers reviews their students' performance on the statewide Algebra I test and look at the percentage correct for each item. For the items with the lowest scores, they look for ways they can strengthen their instruction in those areas in the following year.

• A district uses interim tests every six to ten weeks to check student progress. Students not meeting a certain threshold are required to receive additional instruction on Saturdays.

• A middle school science teacher allocates 14 periods for a unit on pulleys. The content is only planned for the first 11 days. Then a quiz is administered on day 12, not to give a grade, but to help the teacher design appropriate remedial activities for days 13 and 14.

• A history teacher has been teaching about the issue of bias in historical sources. Three minutes before the end of the lesson the teacher distributes index cards and asks students to respond to the question, "Why are historians concerned with bias in historical sources?" Students turn in these exit passes as they leave. The teacher reads through the cards and discards them after she determines that the students have a good enough grasp of the issue for the teacher to move on to the next topic.

• An AP calculus teacher is in the middle of teaching students about graph sketching and wants to move on. She asks students, "Please sketch the graph of y equals one over one plus x squared." Each student quickly sketches the graph on a whiteboard and holds it up for the teacher to see. The teacher sees that the class understands and moves on.

In these examples, evidence of student learning was elicited, interpreted, and used to make a decision about how to adjust instruction to better meet the needs of the students. In each case, the assessment allowed the teacher to make a *smarter* decision about how to adjust instruction than if the evidence had not been collected. Each of the above examples can be considered *formative assessment* even though the first one takes place over a year and the last one within a single period. A good definition of *formative assessment* will have to allow for all of the above examples of formative assessment, such as the one from Dylan Wiliam below:

> **Formative assessment:** An assessment functions formatively to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have made in the absence of that evidence.

Really any type of assessment can be used formatively when it improves decisions about instruction. The key here is that the emphasis is on *decisions*. Decisions lie at the heart of formative assessment. They are the whole reason to have formative assessments to begin with. When schools hire companies to provide regular student testing and feedback data to teachers, this data is often too vague or arrives too late to impact the *decisions* teachers must make about decisions. For this reason, formative assessments should be designed backward from the *decisions* teachers need to make about instruction.

The 5 Strategies of Formative Assessment
The processes of teaching involve: finding out where learners are in their learning, finding out where they are going, and finding out how to get them there. The roles in the classroom include the teacher, the learner, and peer. These processes and roles can be grouped into the five key strategies of formative assessment below:

1. Clarifying, sharing, and understanding learning intentions and criteria for success
2. Eliciting evidence of student learning
3. Providing feedback that moves learning forward
4. Activating learners as instructional resources for one another
5. Activating learners as the owners of their own learning

	Where the learner is going	Where the learner is right now	How to get there
Teacher	1. Clarifying and sharing learning intentions and criteria for success	2. Eliciting evidence of student learning	3. Providing feedback that moves learning forward
Peer	Understanding and sharing learning intentions and criteria for success	4. Activating learners as instructional resources for one another	
Learner	Understanding learning intentions and criteria for success	5.Activating learners as the owners of their own learning	

Each of the next five chapters focuses on one of the above five formative assessment strategies.

Chapter 3 – 1st FORMATIVE ASSESSMENT STRATEGY
Clarifying, Sharing, and Understanding Learning Intentions and Success Criteria

While it might be obvious that students perform better when they understand what they are supposed to be learning, it is relatively recent that teachers began to share learning intentions with students. Even when teachers are required to post a learning objective on the board this does not come close to insuring that students understand what they are supposed to get out of the lesson. This chapter explores what it means to truly clarify, share and help students understand learning intentions and success criteria and provides a few techniques teachers can use with students.

Why Clarifying Learning Intentions is Important
The beginning of the chapter highlights a number of research studies that show the importance of students understanding what they are meant to be doing in class. For example, in one study, one way that students better understood what was expected of them was when their teachers provided them with the nine assessment criteria that the teachers would use to evaluate their work at the end of the unit. Throughout the unit the students rated themselves against these criteria, explained in writing why they deserved the rating they gave themselves, and received feedback from peers on the criteria. By spending all of this time discussing and engaging with the criteria that would ultimately be used to evaluate them, the students developed a deep understanding of what was expected of them. As a result, these students performed better on posttests than those who did not develop this understanding. Further, this study showed that for *lower-achieving* students, engaging in discussions of what constitutes quality work has an even *greater* impact on their achievement. Overall, the research reviewed in the chapter shows that teachers should *make sure* students understand the objective behind the activities they perform in class *and* what counts as quality work.

How Do You Best Communicate Learning Intentions and Success Criteria to Students?
It is not such a simple matter to communicate to students what you want them to learn. Many districts now dictate that teachers post their objectives on the board. In turn, these teachers then require that students write these objectives in their notebooks. Soon after, these objectives, appropriately described as "wallpaper objectives," are ignored and forgotten and have zero impact on learning. This is where rubrics come in. Rubrics can help teachers describe to students what teachers want them to learn. Even *more importantly*, as was described in the study above, by giving students *time* to think through and discuss with others what the rubrics might mean in practice and applied to their own work – this is the type of work that will best help to communicate learning intentions to students.

How to Clarify a **Learning Intention** *and Not Confuse it With a* **Learning Context**
As teachers, we sometimes confuse learning *objectives* with learning *contexts*. Once we teach students something, we are not interested in students replicating exactly what we have taught them, we are interested in students applying what we have taught them. This example is clearest in mathematics. Once we have taught students how to add 3 + 5, we don't want our students to show us that they can add 3 + 5, rather we want them to show us that they have learned the skill of addition and can apply this to a *new* pair of numbers. This may be less obvious in a social studies lesson in which a teacher is teaching her students to understand the impact of banana production on the banana producers themselves. If students study this topic and at the end of the unit the teacher assesses the objective of whether or not the students have learned about the impact of banana production on banana producers the students will most likely get high scores. However, this teacher has confused the *learning objective* with the *learning context*. A <u>better</u> and really <u>clearer</u> learning intention would have been for the students to understand the impact of production on producers in the developing world and banana production would have been the particular context for learning this objective. To see whether students had mastered this objective, that is, whether they could *transfer their learning,* the teacher should have given them an assessment on a different topic such as sugar production. Below are some examples of confused and clarified learning intentions from p.61 in the book:

Confused Learning Objective	Clarified Learning Objective	Context of Learning
To be able to write instructions on how to change a bicycle tire	To be able to write clear instructions	Changing a bicycle tire
To be able to present an argument for or against assisted suicide	To be able to present an argument either for or against an emotionally charged proposition	Assisted suicide
To produce and analyze a questionnaire about movie-going habits	To construct and analyze questionnaire data	Movie-going habits
To design an experiment to find out what conditions pill bugs prefer	To design fair tests for scientific questions	Preferred habitat of pill bugs

Teachers also frequently confuse learning intentions with instructional *activities*. If you ask teachers what they are going to do and they say, "I am going to have the students…" and they specify an activity, then ask, "What will the students *learn* as a result of the activity?" It is often easy to think up cool stuff for kids to do, but with activity-based teaching, it is often *unclear* what students are expected *to learn*.

Some Issues in Constructing Learning Intentions (Objectives) and Success Criteria (Rubrics)
There is already a lot written about constructing learning objectives and success criteria. (See The Main Idea's summaries of *Classroom Assessment* for *Student Learning* by Rick Stiggins and colleagues and *Designing & Teaching Learning Goals & Objectives* by Robert Marzano as resources.) However, below are a few issues to keep in mind.

1. Scoring Rubrics -- Task-Specific vs. Generic?
Rubrics are one way teachers can share success criteria with students. Teachers can design a rubric for one specific task or they can use a generic one that will apply to a number of different assignments. To promote transfer – as was the case in the example earlier with 3 + 5 and the banana production – it is best to use generic rubrics for formative assessment. Then use a more task-specific rubric for the summative assessment to outline more specifically what students must be able to do.

2. Success Criteria – Product-Focused vs. Procesed-Focused Criteria?
In the same way it is helpful to be informed you are on the right track when you are journeying by car, ("You will pass a gas station on the left"), these types of process-focused guidelines are helpful for students as well. For formative assessment, provide students with process success criteria in order to help them bring about the product success criteria you expect for summative assessment. See the example below (from Shirley Clarke, *Formative Assessment in the Secondary Classroom*, 2005).

> **Learning intention**: to write an effective characterization
> **Product success criterion**: the readers will feel as if they know the person
> **Process success criteria**: the characterization includes at least two of the following:
> • the character's hobbies and interests
> • the character's attitudes toward self and others
> • examples of the character's extrovert or introvert personality
> • examples of the character's likes and dislikes

3. Learning Intentions and Success Criteria -- Official vs Student-Friendly Language?
Many authors advocate taking state standards (and now the Common Core State Standards) and presenting them to students in student-friendly language, and there are certainly benefits to this approach. However, keep in mind that it is important for students to come to understand the vocabulary and the "official" language that define each discipline as part of their learning of those disciplines.

Practical Techniques
A concrete way to help students understand learning intentions and success criteria is to have them look at samples of other students' work and discuss the strengths and weaknesses of these pieces. Below are some activities to engage students in this work.

• <u>Co-construct rubrics using sample pieces of student work</u>. One teacher, before having students write their own lab reports, distributed five sample lab reports from the previous year. In groups, students had to decide which reports were better than others and report the reasons why to the whole class. The teacher used these reasons to have the students co-construct a scoring rubric for laboratory reports. Note that this was *not* a democratic process. The teacher used his own knowledge to shape the discussion. By having students spot examples of errors in *other students'* lab reports they were less likely to repeat these errors in their own reports.

• <u>Have students compare their own work to exemplary student work.</u> One high school teacher collected a paper on the system of checks and balances in the American government and assigned each a provisional grade but *did not write anything on the papers*. The next day she returned the students' papers along with copies of the three essays the teacher judged to be the best. The class discussed why they thought these were judged to be good and what features made them strong papers. The students were then invited to rewrite their own papers. Note the considerable intellectual work students had to do to compare their own writing with the exemplary essays -- certainly more than if the feedback had been given by someone else. Being able to engage with the idea of quality work is *not* just reserved for older students. In kindergarten class, students who are assigned to write their names each morning on a large sheet of paper as part of the "daily sign in" can be asked on Friday which of their five sign-ins are the best and why.

Once teachers have clarified what students are expected to learn, the next step is to understand whether they are on track. To do this, teachers must collect evidence about where students are in their learning – the subject of the next chapter.

Chapter 4 – 2nd FORMATIVE ASSESSMENT STRATEGY
Eliciting Evidence of Learners' Achievement

Chapter 3 was about clarifying and communicating what we want students to learn. Now we need to know where students are in their learning. However, most teachers elicit evidence of student learning *on the fly*. They plan the activities they will use to engage their students, but *not* the questions they will use to determine whether students have learned the material sufficiently enough to move on. This chapter helps teachers learn to plan more effective questions (and other alternatives to questions) to ascertain whether individual students as well as the whole class have mastered the material.

Developing questions to reveal student thinking
Questions that give us insight into students' learning are not so easy to generate. In order to come up with these questions, we need to get inside of student thinking and imagine where misconceptions may exist. For example, asking students which fraction is larger, 3/7 or 3/11, would be a *good* question to elicit insight into student learning because students often have the misconception that the larger the denominator, the larger the fraction, when in fact, the reverse is true. While teachers may say that this is a tricky question and therefore shouldn't be used, that may be true for a *high-stakes summative* test, but this is exactly what makes it perfect as a *formative* question that should be accompanied by a classroom discussion.

Coming up with the types of questions that give teachers a window into student thinking is *not easy* and will take time, but this is crucial time that will improve student learning. A common objection to spending time planning these questions for lessons is that teachers don't have this extra time, particularly because they are so bogged down with grading. This just reveals how *ineffective* our current system is. All teachers have had the experience of writing the *same* comment on twenty papers because students left the classroom failing to have fully comprehended a certain concept. It seems far preferable for the teacher to ask the kind of questions that will help them find out whether the students understand something *when there is still time to do something about it* rather than wait until there is a stack of papers to be graded. As Wiliam states wryly, "Viewed from this perspective, grading can be seen as the punishment given to teachers for failing to find out that they did not achieve the intended learning when the students were in front of them."

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In the U.S., teachers spend a majority of their lesson preparation time grading student work, most often alone. However, in *other countries* much of the lesson preparation time is spent planning *how* new topics can be introduced and which contexts and examples should be used. Furthermore, teachers work in groups to design questions to determine whether their teaching has been successful. Because questions that elicit evidence of student learning and thinking are hard to generate, working collaboratively in teams will help teachers develop a stock of good questions. These are often called *hinge-point questions* because the second half of the lesson hinges on the students' understanding up until this point. While some say there's no place in assessment for multiple-choice questions, this can be the perfect format for hinge-point questions. Imagine a teacher introducing a lesson on the rhombus and then showing four shapes, labeled A, B, C, and D, and asking students to hold up cards (A, B, C, or D) to show they understand which shape is the rhombus before moving on. Carefully developing these types of formative assessment questions for lesson plans helps reveal student thinking so teachers can make needed adjustments to teaching without even creating a pile of papers to grade.

Practical Techniques
Teacher-led classroom discussion is one of the most universal pedagogical practices. Contrary to popular belief, American teachers actually talk *less* than teachers in other countries, even those with higher levels of achievement. It turns out that what students learn depends on the *quality* of teacher talk, not the *quantity*. For example, in one larger study of American elementary classrooms, the researchers found the following about the questions teachers asked:
- 57% were management questions (such as "Who has finished all the questions?" or "Have you got your books?")
- 33% required only recall (such as "How many legs does an insect have?")
- Only 8% required students to analyze, make inferences, or to generalize (such as "Why is a bird not an insect?)

Wiliam suggests that there are really only two good reasons to ask questions in class: to provide information for the teacher about what to do next (to reveal student thinking as described above) or to cause thinking. Below are some suggestions for improving questioning and other techniques for eliciting evidence of learning from students. The first part contains suggestions for eliciting evidence of learning from individual students and the second part provides suggestions for gathering evidence from the entire class.

I. Eliciting Evidence of Learning from Individual Students
- <u>Random Calling:</u> Traditionally, in class discussions teachers have *allowed students to choose whether or not to participate* by allowing them to raise their hands. However, this is not an effective technique for engaging students in the lesson or for eliciting evidence of their learning since clearly *not* all students are engaged and the teacher only gathers evidence from the students who *already know the answer*. A more effective questioning technique would be for teachers to choose students at random. To keep students engaged, some teachers use randomization devices to call on students that they download from the Internet or apps for the iPhone. However, simply drawing a Popsicle stick with students' names from a bag will do.

- <u>Interpretive Listening</u>: Another way to better elicit evidence from individual students is through *interpretive listening*. Most teachers simply listen to student responses for <u>correctness</u> rather than *what they can learn about the student's understanding*. When a teacher listens to a student's response and answers, "Almost," or "Try again" that teacher is listening *evaluatively* – only to determine whether the student has answered correctly. Instead, it is more useful if a teacher can learn to listen *interpretively* – "What can I learn about students' thinking by attending carefully to what they say?" Then the teacher might learn from each student's response *how* to adjust instruction to better meet that student's need.

• <u>Question Shells</u>: There are a number of question structures that can help frame questions in ways that reveal students' thinking. One general structure is, "Why is _____ an example of _____?" Asking students, "Is a square a trapezoid?" simply doesn't get as thoughtful and detailed a response as a question like, "Why is a square a trapezoid?" Another question structure that encourages students to reveal their thinking is to present them with a contrast and then ask them to explain that contrast. Below are some examples of ways to reframe questions in order to elicit more evidence of student thinking (from p.86 in the book).

Original	Reframed
Is a square a trapezoid?	Why is a square a trapezoid?
Is carbon a metal?	Why is carbon not a metal?
Is *etre* a regular verb?	Why is *etre* a regular verb?
Is *The Merchant of Venice* a comedy [or a tragedy]?	Why is *The Merchant of Venice* a comedy [a tragedy]?
What is a prime number	Why is 17 prime and 15 is not?
What was life under apartheid like?	How were the lives of blacks and whites different under apartheid?
Is a bat a mammal?	Why is a bat a mammal and a penguin not?

II. Eliciting Evidence of Learners from the Entire Class – All-Student Responses
In deciding what to do next in the lesson, it is particularly useful to elicit evidence of learning from the *entire class*. With an all-student response system the teacher asks a question in a way that allows him or her to get feedback from all of the students in real time. While teachers could go around the class and poll every student, it is ideal to collect the information from students *at the same time*. Below are some techniques to accomplish this.

• <u>Hand Signals</u> – When the whole class simultaneously responds with their hands, teachers can assess their level of understanding instantaneously. For example, in an elementary classroom a teacher had a student come to the board to decide whether the word "its" in a sentence needed an apostrophe. Then she asked the class to use "thinking thumbs" to show whether they thought this student was correct (thumb up = yes, down = no, horizontal = don't know). This same technique can be done at *every level and in every class*. In a high school chemistry class the teacher also used "thinking thumbs" to ask students whether a complicated chemical equation she put on the board was balanced. This shows the teacher immediately if she needs to spend more time teaching apostrophes or balancing chemical equations or if the students have mastered the material and it is appropriate to move on.

• <u>ABCD Cards</u> – If more than a yes/no answer is required, ABCD cards work better than "thinking thumbs." Each student receives a set of cards, each of which has a single letter: A, B, C, and D (or perhaps more: E, F, G, etc.) The teacher poses a question to the class that has multiple answers, such as, "Which of the following four diagrams on the board has one-fourth of the area shaded?" and students hold up the card or cards that correctly answer the question. Again, the teacher can immediately see how many students and which students have understood the objective.

• <u>Mini Whiteboards</u> – Distributing mini dry erase whiteboards provides more flexibility. An elementary teacher can ask all students to write down a four-letter word with a short "i" sound or an AP calculus teacher can ask, "Students, please sketch a graph of y equals one over one plus x squared." Even if a school doesn't have money for this, teachers can use card stock (or graph paper or U.S. maps) and cover them with page protectors so students can draw on them with dry erase markers!

• <u>Exit Passes</u> – Exit passes are written questions teachers give students at the end of class or when there is a natural pause in instruction. Teachers pose questions or problems and use the responses to shape their next lessons. As a result of student responses they may create homogeneous groups and work with the students having the most difficulty *or* they may create heterogeneous groups and make sure to include at least one student who responded well to the exit question. Exit passes usually include questions that require longer responses such as: "Why can't you have a probability of more than 1?", "What is the difference between mass and weight?", and "Why are historians concerned with bias when analyzing historical sources?"

Once a teacher knows where the learners are in their learning, she is ready to provide feedback to the learners about what to do next – the subject of chapter 5.

Chapter 5 – 3rd FORMATIVE ASSESSMENT STRATEGY
Providing Feedback That Moves Learning Forward

While it may seem obvious that teachers give students feedback to *improve* their performance, this chapter introduces a number of research studies that have shown that providing feedback is much more complicated than it may appear. In fact, research shows that many forms of feedback are *counterproductive* and some actually *lower* student performance. Below is a brief summary of some of the research that highlights some of the factors that affect the effectiveness of feedback.

Factors That Affect Whether Feedback is Effective
• <u>Scores and Constructive Comments</u>: In one study, students learned *twice as fast* when they received *constructive feedback* (specific comments on errors, suggestions to the students about how to improve, and at least one positive remark) than their peers who simply received a score on their math homework. In another study, students who only received *scores* made no progress from one task to the next, while those students who received *comments*, improved about 30 percent. This was not surprising. However, it was interesting that students who received *both* a score *and* comments also *made no progress*. The effect of giving them a score had wiped out the benefits of giving them comments! Those with the highest scores felt no need to read the comments and those with the lowest scores did not *want* to read the comments and yet this is the most *common form of feedback* given to students in the United States.

• <u>Praise</u>: In another study, giving written **praise** had *no effect on achievement*. In fact, it had the effect of having the students focus on their egos rather than their academic work.

• <u>Timing</u>: The timing of feedback is also crucial. One study showed that if feedback is given too early, before students have time to work on the task, then they will learn less from the feedback. Furthermore, feedback is only useful if it is given with enough time for the student to *use* the feedback to improve his or her work. It is particularly helpful to give students time, in class, to *use* the feedback to improve their work. Remember that feedback only functions formatively if *the information fed back to the learner is used by the learner in improving performance*. If a teacher writes the following comment on a science assignment after it has been completed, it cannot be of use to the student, "You need to be more systematic in planning your scientific inquiries."

• <u>Scaffolding</u>: In one research study one set of students stuck on a problem received a scaffolded response – just the minimum amount of support to help them solve the problem. Another set of students were given a complete solution. When both sets of students had to solve another similar problem, the students who were given the scaffolded feedback learned more and retained more.

• <u>Action Oriented</u>: Saying what's wrong isn't enough. The secret of effective feedback is to provide a *recipe for future action*. When feedback focuses on what is deficient *without* telling students how to move forward, this does not help the student. For example, when a teacher writes that a student's thesis statement isn't clear this is not very helpful. First of all, this would be a more useful comment *during* learning. Second of all, the student needs a recipe for *how* to make it clearer. It is not enough to simply point out the current state. Feedback must outline a series of scaffolded steps to bring the learner to the desired goal.

Feedback Sometimes LOWERS Performance
A few researchers looked at every high-quality study on the effects of feedback over a **ninety-year period** and found out that in almost **two out of every five** carefully conducted studies, the participants would have **done better** if the feedback had *not* been given at all! To help explain why this might be the case, take a look at what happens when feedback indicates to a participant that his or her performance *falls short* of the goal. There are four possible responses:
  (1) The recipient of the feedback may change the goal, like when a student decides to settle for a B.
  (2) The recipient may abandon the goal altogether, stating for example, "I am no good at math."
  (3) The recipient may reject the feedback altogether. In a workplace this may mean lowering one's commitment.
  (4) The recipient may change his or her behavior to improve performance -- the one response intended by the person giving the feedback.

Out of these four responses, only *one* is likely to improve performance! This suggests teachers need to be cautious when giving feedback. But what affects how students will make sense of their feedback? Carol Dweck, in the research she conducted over thirty years, says that part of it has to do with whether students attribute their success or failure in school to *internal* or *external* factors.

Success	Failure
Internal: "I got a good grade because it was a good piece of work."	Internal: "I got a low grade because it wasn't a very good piece of work."
External: "I got a good grade because the teacher likes me."	External: "I got a low grade because the teacher doesn't like me."

Students develop these ideas based on whether they believe their ability is *fixed* or whether they believe their performance can be improved through *feedback* and hard work. Therefore, as teachers we need to ensure that the feedback we give reinforces the idea that performance can be improved, and by working at it with an incremental approach, students can get smarter.

A Few Principles of Effective Feedback
Overall, the one conclusion all of the research studies in the chapter come to is that *feedback should cause thinking*. Rather than causing a student to react emotionally, effective feedback should cause students to think. Effective feedback helps students focus on what comes next rather than on how well or poorly the student did on the work he or she already completed which is what usually happens in the typical classroom. Below are a few principles of effective feedback.

<u>1st Principle of Effective Classroom Feedback: Feedback should be more work for the recipient</u>
As teachers we have all experienced the frustrations of spending a lot of time writing comments and giving our students grades only to find that our students do not spend any time reading the comments or using the feedback to improve their work. To address this, one technique is called "three questions." With this technique, the teacher sets aside time in class for "what's next?" to allow students to

improve upon their work. The teacher reads through each student's piece of work. When she sees something she would like the student to reflect upon, she writes a number next to it, then under the text she writes the number, the question, and leaves several blank lines for the student to respond. The first ten to fifteen minutes of class are spent responding to the teacher's three questions. No matter how good or bad your work is, everyone responds.

<u>2nd Principle of Effective Classroom Feedback: Feedback should be focused – less is often more</u>
When teachers list everything wrong with a piece of work, students don't know where to begin. Start by listing only one or two areas that need to be fixed and give very specific and scaffolded advice about how to go about improving those areas.

<u>3rd Principle of Effective Classroom Feedback: Feedback should relate to the learning goals shared with students</u>
If a teacher uses a scoring rubric, then feedback should only focus on these criteria. Furthermore, as a way to use comments, and *avoid* scores*,* here is a technique to have students find their own errors. On a math test you can tell students, "Five of these are wrong, you find them." Or for a final piece of writing, a language arts teacher can put a dot in the margins of each line that needs attention.

Overall, teachers need to be careful that in harnessing the power of feedback to improve learning that they are not doing the opposite – stagnating or even harming learning in the ways presented in this chapter. Feedback has the potential to be used in many ways to help students become owners in their own learning – as you will see in the next two chapters.

Chapter 6 – 4th FORMATIVE ASSESSMENT STRATEGY
Activating Students as Instructional Resources for One Another

Although research shows that there is extraordinary power in employing students as instructional resources for one another in the classroom, this approach is rarely employed *effectively* in classrooms. This chapter explores roles that students can play to improve the learning of their peers. For example, one surprising study found that the effect of peer tutoring – one form of activating students as instructional resources -- can be almost as strong as one-on-one instruction from a teacher. What this study revealed is that students often feel reticent about interrupting a teacher to ask for clarification. However, when working with a peer, students often feel comfortable enough to ask the peer to slow down or go over something again and again until they understand. This has tremendous potential. Imagine the power of peer tutoring if, under the right circumstances, struggling students might learn more from peers all because of a change in power relationships.

Like with the research on feedback, not just *any* form of peer assistance produces improvements in student learning. Overall, when students work in cooperative groups, the research shows that *two key features* must be present in order for the cooperative learning to boost achievement. First, there must be group goals. Without goals the students work *in* a group, not *as* a group. Second, each student must be held accountable so that some students cannot be carried along by the achievement of others. While many teachers claim that they are employing "cooperative" learning techniques in their classrooms, unless they include *both* group goals and individual accountability, research shows that they are unlikely to be employing this technique in a way that boosts student achievement.

Practical Techniques
• *C3B4ME* – This stands for "See three before me" and it means that before a student is allowed to ask the teacher for help, he or she needs to seek the assistance of three other students.

• *Peer Evaluation of Homework* – In one math class, in an attempt to reduce the amount of time she had to spend reviewing homework, the teacher used different techniques for students to review each other's homework. Some days she had all students review their homework against a rubric, on other days students swapped their homework and graded it, and on other days a group of four students looked at the homework of another group of four students. This approach resulted in more students doing their homework.

• *Error Classification* – When students receive papers back with comments, they need to "classify" their errors. For example, in a Spanish class, they need to determine whether their mistakes were due to errors in verb tense, gender, pronouns, etc. Then students need to find other students in the room who have made a similar set of mistakes and correct their papers collaboratively.

• *End-of-Topic Questions/Summary* – At the end of a lesson, when most teachers ask, "Does anyone have any questions?" few hands go up. Instead, teachers can put students into cooperative groups and require that they come up with at least one question. Or the teacher can use the group to sum up what the class learned today. These are two effective collaborative group activities.

• *If You've Learned It, Help Someone Who Hasn't* – In some lessons – particularly in mathematics – certain students complete the assignment much more quickly than others. Research shows that when peer tutoring is used to provide elaborated explanations (not just answers), this improves the achievement of both the tutor and the tutee. In Japan, students who already understand a topic are expected to help others who don't. Teachers can make it clear that, for example, to be a good mathematician it is not enough to simply get the right answer. Mathematicians have to be able to explain how they got their answers and communicate their findings to others. For this reason, teachers can set the expectation that students who finish early should help others.

Chapter 7 – 5th FORMATIVE ASSESSMENT STRATEGY
Activating Students as Owners of Their Own Learning

This chapter focuses on the final formative assessment strategy – activating students as owners of their own learning. Research shows that getting students involved in their own learning has the potential to produce extraordinary improvements in their achievement. For example, in one research study a group of mathematics teachers were given two hours of professional development each week to learn how to structure *student self-assessment* – one form of activating students as owners of their own learning. Then these teachers used a *structured* approach in which they had students assess themselves by using objective and precise criteria on a regular feedback. At the end of twenty weeks these students, along with students of teachers who had *not* received the special professional development, took a standardized mathematics test. The students who had learned the self-assessment skills learned in twenty weeks what would otherwise have taken thirty-eight weeks to learn. In other words, using the technique of self-assessment *had almost doubled the rate at which students were learning!*

Self-Regulation
So, how exactly does self-assessment improve learning? The research is not entirely clear on this point, but the most important aspect of self-assessment is *self-regulation.* Self-regulation involves the learner combining his or her cognitive resources with the emotions and actions to carry out the learning goals. If teachers want to help students with self-regulation, they need to understand these two parts of self-regulation. The first part – the cognitive resources – has to do with whether the learner has the necessary knowledge, skills, and strategies to reach the goal. The second part – the emotions and actions – has to do with whether the learner has the *motivation* or *volition* to achieve the learning goal. Teachers can help with these two parts by considering the following:

Metacognition – Helping students recognize their cognitive resources
Metacognition means simply knowing what you know. Research shows that training students in metacognition improves their achievement and helps them transfer what they have learned to novel situations. Teachers can help students become better self-regulators by teaching them metacognition.

Motivation – Helping students stay motivated to learn
Much of the writing about motivation treats it as a *substance* that some students have a lot of and others don't and there is not much that can be done about it. When students fail to learn, we are quick to blame their lack of motivation. However, there is a way of thinking about motivation in which **what the teacher does** *can* make a great deal of difference. For example, some research suggests that when teachers provide goals that are *specific*, *within reach*, and offer *some degree of challenge*, students become much more motivated to learn. In another example in the research that we saw in an earlier chapter, when teachers provide students with positive constructive feedback instead of a grade, this is another way teachers can influence the motivation of students to improve.

How Teachers Can Support Self-Regulation
Below are some of the ways teachers can promote self-regulation in their classes so students can take more ownership over their own learning. These ideas have all been introduced in previous chapters.

1. Share learning goals with students so they are able to monitor their own progress toward them.
2. Promote the belief that ability is incremental rather than fixed so they will be willing to devote energy to improvement.
3. Make it more difficult for students to compare themselves with other students in terms of achievement. One way to do this is to give constructive comments rather than grades.
4. Provide feedback that contains a recipe for future action rather than a review of past failures.
5. Use every opportunity to transfer executive control of the learning from the teacher to the students to support their development as autonomous learners.

Practical Techniques
While activating students as owners of their own learning can produce substantial increases in learning, as with the other formative assessment approaches, it needs to be structured effectively in order to produce results. In one humorous example in which the teacher had not sufficiently structured a self-assessment activity, the teacher did not exactly get the hoped-for results when one student was given the following sentence to complete, "I would learn better in math lessons if…" Instead of self-assessing, he wrote, "I would learn better in math lessons if I had a better math teacher." Below are just a few quick ideas to get started.

• *Traffic Lights* – At the beginning of the lesson, the teacher shares the learning intentions and the success criteria with the students. Students write these in their notebooks. Then the teacher uses "traffic lights" to activate students as owners of their own learning by having the students assess the extent to which they have achieved the intended learning. Students do this by circling the learning intentions in their notebooks in green if they have confidence they have learned the learning intention, yellow if they feel they have partially met the goal, and red if they feel they have *not* learned what was intended. Then the teacher meets with the reds, has the greens help the yellows, and has the yellows make sure the greens can teach the objective to them as a way to hold them accountable.

• *Red/Green Discs* – One way for students to take ownership over their learning is to provide them with CD-sized disks that are green on one side and red on the other. When class begins, the green side should be face up. As the lesson progresses, if students feel the lesson is going too fast, they take ownership for this and flip the disk to signal that they are getting confused.

• *Colored Cups* – This activity truly requires that students monitor their own learning and know whether – at any point – they have a question about the material or are able to answer a question about the content. Each student has a stack of three cups on his or her desk: a red, a yellow, and a green cup. Everyone starts with the green on top, but if the teacher is going too fast, students put a yellow on top. Then if students have a question, they put a red on top. Why would a student put a red on top? Because once a student does this, the teacher can call on any student with a green cup on top to answer that student's question. This requires every student to be on his or her toes and to constantly self-assess – do I understand? Do I have a question? Could I explain this to another student?

The better learners are able to manage their learning, the more they will be able to learn. All students can become owners of their own learning, but it is not easy. It's up to the teachers to teach students the skills to take ownership over their learning and to promote self-regulation by implementing some of these formative assessment techniques.

Overall, Wiliam writes that most of the strategies presented in the book are not new. What is new is the framework provided by classroom formative assessment and the evidence that shows the impact these approaches have on student achievement. His concern, however, is that when teachers attempt to change more than two or three things about their teaching, this often backfires and they end up going back to doing what they were doing before. Instead, he suggests simply choosing one or two techniques from the book to implement and if these become successful, they should do these until they become second nature.

Formative assessment is a perfect topic for school-wide PD. It is a topic that spans all grades and subject areas and can help all teachers boost student achievement. Below are two workshops – the first is a workshop that *introduces* formative assessment and the second addresses formative assessment *strategies*. There is also an accompanying formative assessment TEACHER PACKET.

I. Introduction to Formative Assessment	**II. Formative Assessment Strategies**
1. The difference between formative and summative assessment	1. Clarify and Share Learning Intentions and Success Criteria
2. A working definition of "formative assessment"	2. Elicit Evidence of Students' Achievement
3. Benefits of formative assessment	3. Providing Effective Feedback
	4. Activating Students as Instructional Resources

I. Introduction to Formative Assessment

1. *What is the difference between **formative** and **summative** assessment?*
Ask teachers to think about what they already know about formative assessment and how it differs from summative assessment. They can jot down notes about this in their TEACHER PACKETS and discuss this with someone next to them or in groups of three.

(*Note:* Teachers may mention that **summative assessments**: happen at the *end* of learning, are used to provide a grade, to report student achievement *after* the learning has occurred, etc. They may say **formative assessments** are given *during* the learning, help teachers check for understanding, help inform instruction, do not count toward a student's grade, etc.)

2. *Which kinds of assessments can be considered "formative"?*
Have teachers look at the five assessment examples below (these are in their teacher packets) and discuss with their partners which ones they would consider to be examples of formative assessment, and why or why not, based on their prior knowledge.

A. Each year a group of Algebra I teachers review their students' performance on the statewide Algebra I test and look at the percentage correct for each item. For the items with the lowest scores, they look for ways they can strengthen their instruction in those areas in the following year.

B. A district uses interim tests every six to ten weeks to check student progress. Students not meeting a certain threshold are required to receive additional instruction on Saturdays.

C. A middle school science teacher allocates 14 periods for a unit on pulleys. She plans content only for the first 11 days. Then she administers a quiz on day 12, not to give a grade, but to help her design appropriate remedial activities for days 13 and 14.

D. A history teacher has been teaching about the issue of bias in historical sources. Three minutes before the end of the lesson the teacher distributes index cards and asks students to respond to the question, "Why are historians concerned with bias in historical sources?" Students turn in these exit passes as they leave. The teacher reads through the cards and discards them after she determines that the students have a good enough grasp of the issue for the teacher to move on to the next topic.

E. An AP calculus teacher is in the middle of teaching students about graph sketching and wants to move on. She asks students, "Please sketch the graph of y equals one over one plus x squared." Each student quickly sketches the graph on a whiteboard and holds it up for the teacher to see. The teacher sees that the class understands and moves on.

After teachers have discussed the five examples above, discuss them as a group. See which ones the teachers consider to be examples of formative assessment. Then provide them with this strong definition of *formative assessment* from Wiliam Dylan. They have a blank box in their teacher packets – they can fill it in with this definition:

> **Formative assessment:** An assessment functions formatively to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have made in the absence of that evidence.

Now ask teachers which of the examples above would be considered formative assessment? You can have the teachers discuss this or explain that ALL of the above are examples of formative assessment if we use Dylan Wiliam's definition.

3. *What are the **benefits** of formative assessment?*
Given Dylan Wiliam's excellent definition of formative assessment, as a large group, brainstorm some of the benefits of formative assessment. Teachers can capture some of these ideas in the notes section of their packet.

Note: Make sure teachers suggest the following: Formative assessment shows students what they need to improve, helps to clarify what the goal is and how to get there, helps teachers better tailor their lessons to student needs, and has an effect size of $d = 0.90$ and in fact teachers using formative assessment make almost twice as much progress with their students as those who don't. The main point is that formative assessment actually *improves* learning – this is also the biggest difference from summative assessment.

II. Formative Assessment Strategies

Dylan William cautions against teachers attempting to change more than two or three things about their teaching. For this reason, teachers should choose *two to three strategies* from those below that they would like to implement until these become successful.

Strategy 1: Clarify and Share Learning Intentions and Success Criteria

It is vital that teachers clearly convey their learning intentions (objectives) and success criteria (how they know when students have met those objectives) to students.

1. How do we best communicate objectives and success criteria to students?

Ask teachers to think silently: How many of them write the lesson objective on the board? How many of them have students copy that objective in their notebooks? Ask teachers why these have often been called "wallpaper" objectives with no effect? Explain to teachers that research has shown that when students actually know what is expected of them in class – that is, when they have a *deep* understanding of the criteria that will be used to evaluate them and what counts as quality work, their achievement levels go way up.

Have teachers work in pairs, grade teams, or department teams. Ask them: If you had a sample piece of **exemplary student work** (an excellent essay, lab, piece of art work, Spanish dialogue, etc.) – how might you use this at the *beginning* of a lesson or unit to familiarize students with what is expected of them by the end of the lesson/unit? By the same token, if you had the **rubric** you would be using to evaluate (summatively) a final piece of student work (a lab report, a history paper, a book report, etc.), how could you use this rubric *during their learning* to familiarize your students with the expectations to which they will be held at the end of the unit?

2. Plan for tomorrow's lesson or the next unit

Have teachers take *one* of the ideas brainstormed from above, and write it into their lesson plan for tomorrow or the next unit coming up. Use time during this PD session for this to happen and for teachers to get feedback from others in their group for their ideas.

Strategy 2: Elicit Evidence of Students' Achievement

The heart of formative assessment is eliciting evidence of student learning in order to use it to make decisions about next steps in instruction. For this reason, teachers need to use the best possible strategies to elicit evidence of student achievement.

1. How do we best elicit evidence of students' achievement?

Without having teachers raise their hands, ask them to think silently about this question: When they want to check for understanding to move on with the lesson, how many of them call on one student who has a raised hand? And if that student gets the question correct, how many of them move on? Discuss with the group, what is the problem with this method for checking for understanding?

Have teachers work in pairs, grade teams, or department teams. Ask them: If you just taught your students something – for example, that a rhombus is a quadrilateral whose four sides all have the same length – how could you check that the *whole* class has understood the concept before moving forward? Brainstorm as many ways as possible!

Group share – come back as a large group to share. If teachers have *not* mentioned the strategies in the table below, then ask teachers who have used them in their own practice to share them (these are in the TEACHER PACKET). Remind teachers of the objective – to take away 2 – 3 strategies they will use in their own classrooms, so they should take notes on strategies they want to use.

Hand Signals – Students use "thinking thumbs" to show whether they agree, disagree, or don't know. This can be used after one student answers to see if the rest of the students agree (thumb up = yes, down = no, horizontal = don't know).
ABCD Cards – Each student receives a set of cards, each with a single letter: A, B, C, and D (or perhaps more: E, F, G, etc.) The teacher poses a question that has multiple answers, such as, "Which of the following four diagrams on the board has one-fourth of the area shaded?" and students hold up the card or cards that correctly answer the question. The teacher can immediately see which students have understood.
Mini Whiteboards – Mini dry erase whiteboards provides more flexibility. An elementary teacher can ask all students to write down a four-letter word with a short "i" sound or an AP calculus teacher can ask students to sketch a graph of y equals one over one plus x squared. You can also use card stock (with plain paper, graph paper, or US maps), covered with page protectors and use dry erase markers!
Exit Passes – Exit passes are written questions teachers give students at the end of class or when there is a natural pause in instruction. Teachers pose questions or problems and use the responses to shape their next lessons. Exit passes usually include questions that require longer responses such as: "Why can't you have a probability of more than 1?" or "Why are historians concerned with bias when analyzing historical sources?"

To practice formative assessment strategies *during* this workshop, use thumbs up or down to ask if teachers need a break and tell them there will be index cards as exit passes at the end to ask which strategies they will be implementing and what they have learned!

2. Plan for tomorrow's lesson or the next unit

Ask teachers: Take tomorrow's lesson plan write in where you plan to check for understanding in a way that elicits evidence from *everyone* so you know how to proceed in the lesson.

<p style="text-align:center">Strategy 3: Providing Effective Feedback</p>

Research shows that not all forms of feedback move students forward and some feedback actually lowers student performance!
Ask teachers to think back to the worst grade they ever received and how they reacted to it in pairs.

1. How do we provide feedback to students in a way that increases their achievement?

If teachers want their feedback to impact students in the *right* way, their feedback should get students to *think*! Feedback should *not* cause students to have an *emotional* response (which is what a score/grade does). Research shows that in order for feedback to be effective, it should *not* include a score/grade and it should have the following components listed below. Have teachers self-assess by thinking about the last 3 assessments they gave and their feedback to students. Which of the following characteristics of effective feedback did their feedback contain? (This chart is in their TEACHER PACKET.)

Effective feedback involves…	Feedback on Assessment 1:	Feedback on Assessment 2:	Feedback on Assessment 3:
1. No Score			
2. Given with time to improve (preferably in class!)			
3. Minimal praise (and if so, specific and credible)			
4. Scaffolding (just the minimum amount of support to improve and no more)			
5. Action-oriented (moving beyond telling what's wrong and outlining a series of steps the student needs to take to improve)			

2. Plan for Feedback on Your Next Assessment

Ask teachers: How will you do feedback differently on your next assessment? For example, for your next math test, instead of giving a score, simply write at the top, "Five of these are wrong. Find your own errors." For an essay, put a dot in the margins of each line that needs attention. Or, plan to schedule a half of a period after each assessment for students to correct errors. Choose an approach and write it into your plans now.

<p style="text-align:center">Strategies 4 and 5: Activating Students as Instructional Resources for One Another and Themselves</p>

Research shows that using students to provide feedback to each other, and themselves, produces improvements in student learning.

1. How do we activate students as instructional resources for themselves and others?

Have teachers discuss: In what ways do you use students, individually and in cooperative groups, to assist other students or give other students feedback? In what ways do you help students take ownership of their own learning? (Through, for example, setting goals and tracking their progress toward those goals, self-reflecting, monitoring when they understand in class and when they need help, etc.)

2. Plan to make better use of students as instructional resources

Have teachers look at the suggestions below from the book (and in the Teacher Packets) and adapt one for use in an upcoming class:

C3B4ME – This stands for "See three before me" and it means that before a student is allowed to ask the teacher for help, he or she needs to seek the assistance of three other students.

Peer Evaluation of Homework – One teacher used different techniques for students to review each other's homework. Some days she had all students review their homework against a rubric, on other days students swapped their homework and graded it, and on other days a group of four students looked at the homework of another group of four students.

If You've Learned It, Help Someone Who Hasn't – In some lessons – particularly in math – certain students complete the assignment more quickly than others. Create the expectation that students who already understand a topic are expected to help others who don't.

Colored Cups – This activity activates students as owners of their own learning because they are responsible for monitoring their own comprehension. Each student has a stack of three cups on his or her desk: a red, a yellow, and a green cup. Everyone starts with the green on top, but if the teacher is going too fast, students put a yellow on top. Then if students have a question, they put a red on top. Why would a student put a red on top? Because once a student does this, the teacher can call on any student with a green cup on top to answer that student's question. This requires every student to be on his or her toes and to constantly self-assess – do I understand? Do I have a question? Could I explain this to another student?

EXIT TICKET – Ask all workshop participants to take an index card and write: 1) What are the most important ideas you learned about formative assessment? 2) What 2-3 strategies do you plan to implement in your class?
Explain that this Exit Ticket is an example of formative assessment – it will help the presenter know what type of follow-up to this workshop is needed based on teachers' understanding of formative assessment and their implementation plans.

EXTRA IDEA – If an interested group of teachers would like to research and present some exciting ways to formatively assess what students know using *technology tools*, here are a few to get them started: Understood It (understoodit.com), Poll Everywhere (polleverywhere.com), and Socrative (socrative.com) – these examples are in their TEACHER PACKET.