

Visible Assessing

The mistake I was making was seeing feedback as something teachers provided to students—they typically did not, although they made claims that they did it all the time, and most of the feedback they did provide was social and behavioral. It was only when I discovered that feedback was most powerful when it is from the student to the teacher that I started to understand it better. When teachers seek, or at least are open to, feedback from students as to what students know, what they understand, where they make errors, when they have misconceptions, when they are not engaged—the teaching and learning can be synchronized and powerful.

(Quoted from Hattie, 2009, p. 173)

Think about the VISIBLE ASSESSING Criteria...		
<ul style="list-style-type: none"> • Identifies and communicates challenging success criteria in checklists and rubrics. • Pre-assesses to determine what students already know and can do. • Checks for understanding and achievement of learning intentions. • Provides specific descriptive feedback. • Engages students in self-assessment of their work, what they learn, and how they learn. • Uses existing products or samples as models for student products. • Uses assessments aligned with objectives/learning intentions/standards and instructional processes. • Provides choices in assessment products. • Engages students in giving specific feedback to peers and to the teacher. • Involves students in setting learning goals. 		
Examine the Crosswalk to Influences Identified by Hattie with Medium to High Effect Sizes...	Effect Size	Read about It in Hattie (2009)
Self-reported grades	d = 1.28	p. 43-44
Providing formative evaluation	d = .90	p. 181
Feedback	d = .73	p. 173-178
Self-verbalization and self-questioning	d = .64	p. 192-193
Study skills	d = .59	p. 189-192
Worked examples	d = .57	p. 172-173
Goals	d = .56	p. 162-167
Peer tutoring	d = .55	p. 186-187
Self-concept	d = .43	p. 46-47

Summary of Visible Assessing

Visible Assessing is crucial because it links *Visible Teaching* and *Visible Learning*. Clear learning intentions/objectives provide the foundation for visible assessing; visible assessing practices clarify learning intentions by making success criteria concrete and transparent for students. Moreover, effective teachers apply learning intentions to pre-assess students to determine what they know and can do to differentiate instruction. This is especially important given the research, “finding that most of the material taught in a class is already know by the students (Hattie, 2009, p. 32). In this 21st century information is doubling every year and a half; the necessity to focus on developing 21st century skills behooves us to determine when to re-teach, accelerate, or enrich. Visible assessing practices provide tools for ensuring that is being *taught* is what needs to be *learned*.”

For visible assessing teachers use checklists, rubrics, and worked examples for, “demonstrating to students what success looks like and thus what the goal could be for their own learning” (Hattie, 2009, p. 172). They teach students how to use rubrics and checklists to reflect on what they do well and how they can improve. Through self-questioning, self-verbalizing, and self-reported grades students learn to establish concrete learning goal; learning becomes more personalized and engaging. Such practices empower students thereby helping them to grow positive self-concepts.

Feedback is an important characteristic if visible assessing. In a classroom where visible assessing is evident, not only do teachers give specific feedback to students, students also give specific feedback to teachers and to their peers. Peer tutoring provides, “many academic and social benefits for those tutoring *and* those being tutored” (Hattie, 2009, 187).

Visible assessing practices encompass assessment FOR learning strategies outlined by the ETS Assessment Training Institute directed by Stiggins. Assessment FOR learning differs from assessment OF learning. Assessment OF Learning is used to determine how much students have learned as of a particular point in time in order to report achievement status to others. Assessment FOR Learning includes those activities undertaken by teachers and by their students [that] provide information to be used as feedback to modify the teaching and learning activities in which they are engaged (Black & Wiliam, 1998). Table 2 summarizes seven assessment FOR learning strategies.

SEVEN ASSESSMENT FOR LEARNING STRATEGIES

Stiggins, R.J., Portland, Oregon: ETS Assessment Training Institute-www.ets.org/ati.

Assessment FOR Learning Strategy	Description
1. Share understandable vision of the learning target.	<ul style="list-style-type: none"> • Share the target (achievement expectation) prior to the lesson or assignment. • Provide focused targets—not too many. • State target in clear terms. • Ask students to brainstorm characteristics of quality work. • Show samples of high and low quality work and alter list of quality work. • Help students to see how they already know much of what is required.
2. Use models of strong and weak work.	<ul style="list-style-type: none"> • Ask student to apply rubric to samples and justify scores. • Begin with single trait and then move to multiple traits. • Share examples of products or performances from life beyond school. • Model creating the product or performance yourself.
3. Offer descriptive feedback instead of grades.	<ul style="list-style-type: none"> • Reflect the learning target. • Tell how close students are to achieving the target. • Be selective in what feedback is provided. • Relate what the learner accomplished and the learner’s “next steps.”
4. Teach students to self-assess.	<ul style="list-style-type: none"> • Help students identify strengths and areas for improvement. • Encourage students to maintain a list of learning targets and identify that have been mastered.
5. Design lessons to focus on one aspect of quality at a time.	<ul style="list-style-type: none"> • Conduct a task analysis. • Use the rubric as a guide to identify aspects of quality.
6. Teach students to revise by practicing on other people’s work and then on their own work.	<ul style="list-style-type: none"> • Show how you would revise a product or performance and then let them revise a similar, but different piece. • Ask students to analyze your work. • Ask students to revise a work in progress, revising for the trait discussed.
7. Engage students in self-reflection and goal setting.	<ul style="list-style-type: none"> • Write a process paper. • Write a letter to parents explaining progress. • Tell a partner how they arrived at an answer. • Write a description of quality. • Reflect on growth: <i>Here’s what I have learned...Here’s what I need to work on.</i> • Encourage student led parent conferences.

Table 2. Seven Assessment FOR Learning Strategies

Sample Professional Growth Opportunities for Visible Assessing

1. Review the research on Visible Assessing.

Objectives:

- To analyze pertinent research on visible assessing
- To reflect on research in light of current practices

Materials:

- Copies of the crosswalk between the visible teaching criteria and pertinent research on high-yield strategies and the *Summary of Visible Assessing* (guide pages 35-37)
- One reflection journal for each participant
- One copy of In Shape Thinking slide (guide page 39)
- One copy of the book *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement* per participant (optional)

Procedure:

- a) Distribute copies of the crosswalk and summary.
- b) Ask participants to read and analyze the crosswalk and summary.
- c) Present reflection stems.
 - Something that squares off with my beliefs...
 - Something that is circling around in my head...
 - Important points for me to apply...
- d) Ask participants to share reflections with team or pair
- e) Process reflections with the whole-group
- f) Ask participants to reflect on the extent to which they implement visible assessing practices.
- g) Optional: Jigsaw reading about the influences identified in Hattie's book. Create teams of 4 to 5 members. Each team member can be assigned to read about 2-3 influences and share with team.

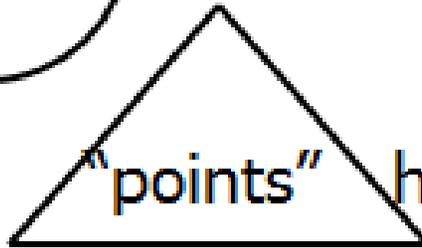
"IN SHAPE" THINKING

Reflect on Visible Assessing Influences.

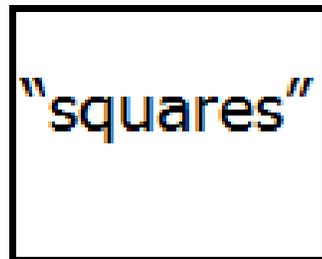
What is "circling" around in your mind?



What important "points" have been made?



What "squares" off with your beliefs?



2. Read and discuss an article pertinent to visible assessing practices.

Objectives:

- To investigate assessment FOR learning strategies and their influence on students
- To establish goals for improving visible assessing

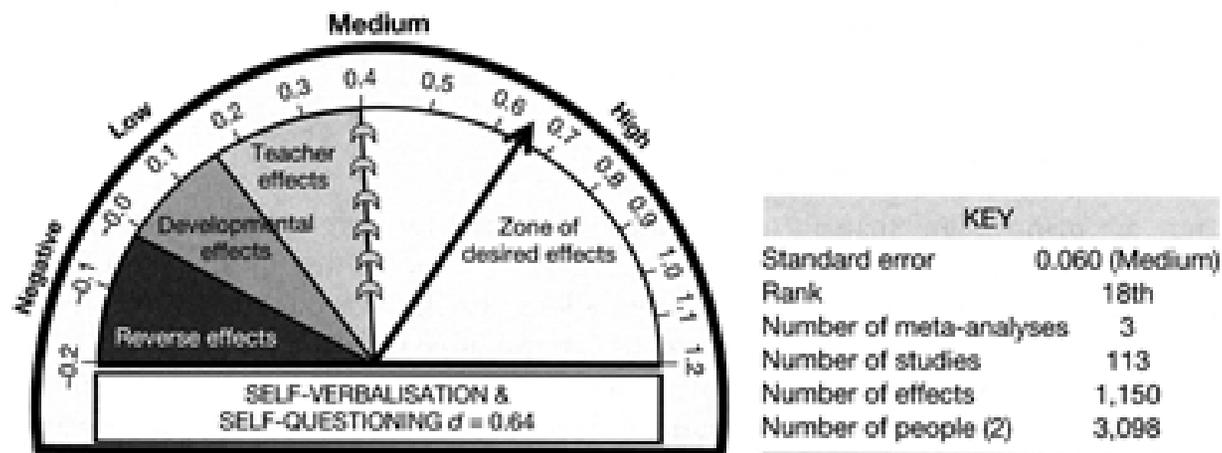
Materials:

- An enlarged copy of Hattie's barometer on self-verbalization/self-questioning (guide page 41)
- One copy of the article *Assessment Through the Student's Eyes* for each participant (guide pages 42-47)
- One copy of the Reflection: Through the Students Eyes graphic organizer for each participant (guide page 48)

Procedure:

- a. Show Hattie barometers on self-verbalization/self-questioning.
- b. Distribute the article *Assessment Through the Student's Eyes* by Rick Stiggins and the reflection graphic organizer.
- c. Ask participants to read article. As they are reading use the reflection graphic organizer to capture notes.
- d. Ask staff to share their notes with their team or in pairs.
- e. Process by asking teams or pairs to share important points with the whole group.
- f. Ask participants to complete the last prompt on the reflection graphic organizer
- g. Discuss implications for professional development. What would participants like to learn?

Self-Verbalization/ Self-Questioning



Hattie, J. (2009). *Visible Learning: A Synthesis of over 800 Meta-Analyses Relating to Achievement*, p. 193.



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Assessment Through the Student's Eyes

Rick Stiggins

Rather than sorting students into winners and losers, assessment for learning can put all students on a winning streak.

Historically, a major role of assessment has been to detect and highlight differences in student learning in order to rank students according to their achievement. Such assessment experiences have produced winners and losers. Some students succeed early and build on winning streaks to learn more as they grow; others fail early and often, falling farther and farther behind.

As we all know, the mission of schools has changed. Today's schools are less focused on merely sorting students and more focused on helping *all* students succeed in meeting standards. This evolution in the mission of schools means that we can't let students who have not yet met standards fall into losing streaks, succumb to hopelessness, and stop trying.

Our evolving mission compels us to embrace a new vision of assessment that can tap the wellspring of confidence, motivation, and learning potential that resides within every student. First, we need to tune in to the emotional dynamics of the assessment experience from the point of view of students—both assessment winners and assessment losers. These two groups experience assessment practices in vastly different ways, as shown in "The Assessment Experience," p. 24. To enable all students to experience the productive emotional dynamics of winning, we need to move from exclusive reliance on assessments that verify learning to the use of assessments that support learning—that is, assessments *for* learning.



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The Assessment Experience	
For Students on Winning Streaks	For Students on Losing Streaks
Assessment results provide	
Continual evidence of success	Continual evidence of failure
The student feels	
Hopeful and optimistic	Hopeless
Empowered to take productive action	Initially panicked, giving way to resignation
The student thinks	
It's all good. I'm doing fine.	This hurts. I'm not safe here.
See the trend? I succeed as usual.	I just can't do this....again.
I want more success.	I'm confused. I don't like this - help!
School focuses on what I do well.	Why is it always about what I can't do?
I know what to do next.	Nothing I try seems to work.
Feedback helps me.	Feedback is criticism. It hurts.
Public success feels good.	Public failure is embarrassing.
The student becomes more likely to	
Seek challenges.	Seek what's easy.
Seek exciting new ideas.	Avoid new concepts and approaches.
Practice with gusto.	Become confused about what to practice.
Take initiative.	Avoid initiative.
Persist in the face of setbacks.	Give up when things become challenging.
Take risks and stretch - go for it!	Retreat and escape - trying is too dangerous!
These actions lead to	
Self-enhancement	Self defeat, self-destructions
Positive self-fulfilling prophecy	Negative self-fulfilling prophecy
Acceptance of responsibility	Denial of responsibility
Manageable stress	High stress
Feeling that success is its own reward	No feelings of success; no reward
Curiosity, enthusiasm	Boredom, frustration, fear
Continuous adaptation	Inability to adapt
Resilience	Yielding quickly to defeat
Strong foundations for future success	Failure to master prerequisites for future success

Assessment *for* Learning

Assessment for learning turns day-to-day assessment into a teaching and learning process that enhances (instead of merely monitoring) student learning. Extensive research conducted around the world shows that by consistently applying the principles of assessment for learning, we can produce impressive gains in student achievement, especially for struggling learners (Black & Wiliam, 1998).

Assessment for learning begins when teachers share achievement targets with students, presenting those expectations in student-friendly language accompanied by examples of exemplary student work. Then, frequent self-assessments provide students (and teachers) with continual access to descriptive feedback in amounts they can manage effectively without being overwhelmed. Thus, students can chart their trajectory toward the transparent achievement targets their teachers have established.

The students' role is to strive to understand what success looks like, to use feedback from each assessment to discover where they are now in relation to where they want to be, and to determine how to do better the next time. As students become increasingly proficient, they learn to generate their own descriptive feedback and set goals for what comes next on their journey.

Teachers and students are partners in the assessment for learning process. For example, teachers might have students study samples of work that vary in quality and collaborate in creating their own student-friendly version of a performance assessment scoring rubric. Or students might create practice versions of multiple-choice tests that parallel the content of an upcoming final exam, which they can then use to analyze their own strengths and weaknesses and to focus their final preparation for that exam. Students can accumulate evidence of their learning in growth portfolios. They can also become partners with teachers in communicating about their own learning successes by leading their parent/teacher conferences.

Assessment for learning provides both students and teachers with understandable information in a form they can use immediately to improve performance. In this context, students become both self-assessors and consumers of assessment information. As they experience and understand their own improvement over time, learners begin to sense that success is within reach if they keep trying. This process can put them on a winning streak and keep them there.

When we use assessment for learning, assessment becomes far more than merely a one-time event stuck onto the end of an instructional unit. It becomes a series of interlaced experiences that enhance the learning process by keeping students confident and focused on their progress, even in the face of occasional setbacks.

The goal of assessment for learning is not to eliminate failure, but rather to keep failure from becoming chronic and thus inevitable in the mind of the learner. Duke University basketball coach Mike Krzyzewski has pointed out that the key to

winning is to avoid losing twice in a row (Kanter, 2004, p. 251). He meant that if you lose once and fix it, you can remain confident. Losing twice, though, can raise questions, crack that confidence, and make recovery more difficult. So when learners suffer a failure, we must get them back to success as quickly as possible to restore their confidence in their capabilities. This is the emotional dynamic of assessment for learning.

Scenario 1: Set Students Up for Success

Here is an example of the use of assessment for learning that builds student confidence from the start. Notice who develops and uses the assessment.

A high school English teacher assigns students to read three novels by the same author and develop a thesis statement about a common theme, consistent character development, or social commentary in the novels. They must then defend that thesis in a term paper with references. To set students up for success, the teacher begins by providing them with a sample of an outstanding paper to read and analyze. The next day, the class discusses what made the sample outstanding.

As their next assignment, the teacher gives students a sample paper of poor quality. Again, they analyze and evaluate its features in some detail. Comparing the two papers, students list essential differences. The class then uses this analysis to collaboratively decide on the keys to a high-quality paper.

After identifying and defining those keys, the students share in the process of transforming them into a rubric—a set of rating scales depicting a continuum of quality for each key. The teacher provides examples of student work to illustrate each level on the quality continuum.

Only after these specific understandings are in place do students draft their papers. Then they exchange drafts, analyzing and evaluating one another's work and providing descriptive feedback on how to improve it, always using the language of the rubric. If students want descriptive feedback from their teacher on any particular dimension of quality, they can request and will receive it. The paper is finished when the student says it is finished. In the end, not every paper is outstanding, but most are of high quality, and each student is confident of that fact before submitting his or her work for final evaluation and grading (Stiggins, in press; Scenario 1 adapted by permission).

Scenario 2: Help Students Turn Failure into Success

Here is an illustration of assessment for learning in mathematics used to help a struggling elementary student find the path to recovery from a chronic sense of failure. Notice how the teacher highlights the meaning of success and turns the responsibility over to the student. In addition, notice how the learner has already begun to internalize the keys to her own success.

Gail is a 5th grader who gets her math test back with "60 percent" marked at the top. She knows this means another *F*. So her losing streak continues, she thinks. She's ready to give up on ever connecting with math.

But then her teacher distributes another paper—a worksheet the students will use to learn from their performance on the math test. What's up with this? The worksheet has several columns. Column one lists the 20 test items by number. Column two lists what math proficiency each item tested. The teacher calls the class's attention to the next two columns: *Right* and *Wrong*. She asks the students to fill in those columns with checks for each item to indicate their performance on the test. Gail checks 12 right and 8 wrong.

The teacher then asks the students to evaluate as honestly as they can why they got each incorrect item wrong and to check column five if they made a simple mistake and column six if they really don't understand what went wrong. Gail discovers that four of her eight incorrect answers were caused by careless mistakes that she knows how to fix. But four were math problems she really doesn't understand how to solve.

Next, the teacher goes through the list of math concepts covered item by item, enabling Gail and her classmates to determine exactly what concepts they don't understand. Gail discovers that all four of her wrong answers that reflect a true lack of understanding arise from the same gap in her problem-solving ability: subtracting 3-digit numbers with regrouping. If she had just avoided those careless mistakes and had also overcome this one gap in understanding, she might have received 100 percent. Imagine that! If she could just do the test over

. . .

She can. Because Gail's teacher has mapped out precisely what each item on the test measures, the teacher and students can work in partnership to group the students according to the math concepts they haven't yet mastered. The teacher then provides differentiated instruction to the groups focused on their conceptual misunderstandings. Together the class also plans strategies that everyone can use to avoid simple mistakes. When that work is complete, the teacher gives students a second form of the same math test. When Gail gets the test back with a grade of 100 percent, she jumps from her seat with arms held high. Her winning streak begins (Stiggins, Arter, Chappuis, & Chappuis, 2004; Scenario 2 adapted by permission).

Redefining Our Assessment Future

We know how to deliver professional development that will give practitioners the tools and technologies they need to use assessment effectively in the service of student success. (Stiggins et al., 2004; Stiggins & Chappuis, 2006). Thus far, however, the immense potential of assessment for learning has gone largely untapped because we have failed to deliver the proper tools into the hands of teachers and school leaders. If we are to fulfill our mission of leaving no child behind, we must adjust our vision of excellence in assessment in at least two important ways that will help us balance assessment *of* and assessment *for* learning.

First, we must expand the criteria by which we evaluate the quality of our assessments at all levels and in all contexts. Traditionally, we have judged quality in terms of the attributes of the resulting scores; these scores must lead to valid

and reliable inferences about student achievement. As a result, schools have lavished attention on characteristics of the instruments that produce such scores. In the future, however, we must recognize that assessment is about far more than the test score's dependability—it also must be about the score's effect on the learner. Even the most valid and reliable assessment cannot be regarded as high quality if it causes a student to give up.

We must begin to evaluate our assessments in terms of both the quality of the evidence they yield and the effect they have on future learning. High-quality assessments encourage further learning; low-quality assessments hinder learning. Understanding the emotional dynamics of the assessment experience from the student's perspective is crucial to the effective use of assessments to improve schools.

Second, we must abandon the limiting belief that adults represent the most important assessment consumers or data-based decision makers in schools. Students' thoughts and actions regarding assessment results are at least as important as those of adults. The students' emotional reaction to results will determine what they do in response. Whether their score is high or low, students respond productively when they say, "I understand. I know what to do next. I can handle this. I choose to keep trying." From here on, the result will be more learning. The counterproductive response is, "I don't know what this means. I have no idea what to do next. I'm probably too dumb to learn this anyway. I give up." Here, the learning stops.

In standards-driven schools, only one of these responses works, especially for students who have yet to meet standards. Assessment *for* learning is about eliciting that productive response to assessment results from students every time. It can produce winning streaks for *all* students.

References

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Rick Stiggins is Founder and Director of the ETS Assessment Training Institute, 317 SW Alder St., Suite 1200, Portland, OR, 97204; 800-480-3060; www.ets.org/atj.

REFLECTION: THROUGH THE STUDENTS EYES

What happens to students when classroom assessment is done well?

What does "done well" look like?

What happens to students when classroom assessment is done poorly?

What does "done poorly" look like?

Why is Assessment FOR Learning student friendly and motivating?

What is something you plan to do to implement Assessment FOR Learning and to make assessment more student friendly?

3. Identify and develop good criteria.

Objectives:

- To investigate characteristics of effective criteria
- To apply criteria to student products

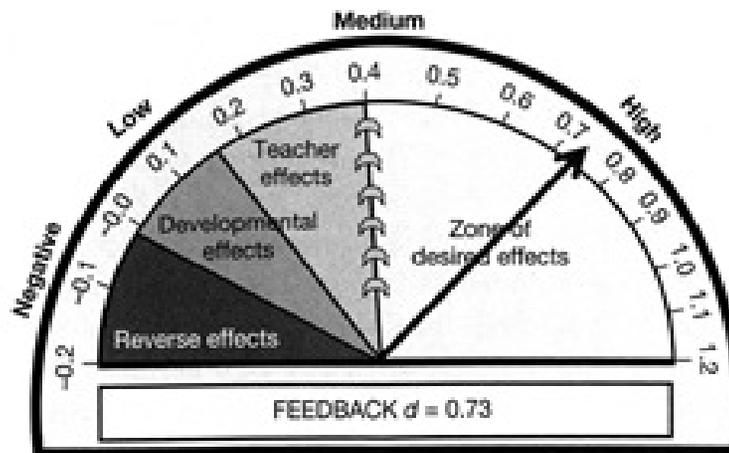
Materials:

- Slide of Hattie's barometer for feedback (guide page 50)
- Slide on Characteristics of Good Criterion (guide page 51)
- Slide on Guidelines for Developing Criteria (guide page 52)
- Slide on Questions to Ask When Identifying Criteria (guide page 53)
- Slide on Strategy 1 investigation (guide page 54)
- Slide on Strategy 2 investigation (guide page 55)
- Handout on developing and using criteria (guide pages 56-58)

Procedure:

- a) Show Hattie barometer slide on feedback.
- b) Divide group in half and read questions on slide. Ask group A reads red, B reads blue.
- c) Use Strategy 1 slide to lead investigation
- d) Ask teams to brainstorm a list of characteristics of a high quality response to an open-ended math problem on guide handout page 56.
- e) Ask individuals to solve problem on guide handout page 56 independently and then as teams re-examine, add to, or change characteristics.
- f) Ask groups to examine samples 5 and 7 on guide handout page 57 and think about whether their characteristics should be altered.
- g) Ask groups to compare and contrast their list of characteristics with those at the top of guide handout 58. What do they notice?
- h) Confirm the need for student friendly language in targets.
- i) Refer to problem solving rubric on guide handout page 59 to lead into Strategy 2-strong and weak examples of student work.
- j) Ask teams to highlight key words for 5 score, then compare to 1 score, then #3 level. Note the differences. Ask what would make a 4 or a 2 score?
- k) Ask teams to apply rubric to three samples of student work--#5, #7, and #8 and come to consensus about scoring. Note on flip chart paper various groups' responses.
- l) Process the learning experience. What did participants learn? How can they transfer the process to their classrooms?

The Power of Formative Feedback



KEY	
Standard error	0.061 (Medium)
Rank	10th
Number of meta-analyses	23
Number of studies	1,287
Number of effects	2,050
Number of people (10)	67,931

Characteristics of Good Criterion

- Clearly stated
- Brief
- Observable
- Distinct
- Written in language students understand
- Shared in advance



Guidelines for Developing Criteria

- _____ the number of criteria.
- Keep to the _____ elements of the task.
- Do not try to assess _____ on the task.
- Smaller tasks typically require _____ criteria.

Questions to Ask When Identifying Criteria

- Do the criteria make sense?
- Can you distinguish one from another?
- Can you envision examples of each?
- Are they all worth assessing?
- Do students know how they would use the criteria to begin their work and check their work?



Strategy 1: Make Learning Targets Clear to Students

- Brainstorm a list of characteristics of a high quality response to an open-ended mathematics problem .
- Solve the problem on your handout.
- Add additional characteristics of a high-quality response to your brainstormed list.
- Compare two samples . Do these samples remind you of anything else you would like to add to the list?
- Compare your list of characteristics to those on your handout. What do you observe?

Strategy 2: Use Models of Strong and Weak Work

- Read the description of strong *Problem Solving (5)*. Highlight the key words.
- Read the description for weak *Problem Solving (1)*, then middle level *(3)*.
- Discuss and decide which level describes Sample 5 and justify your score by using the language of the rubric.
- Repeat the process for Sample's 7 and 8.
- Be prepared to share.

LEARNING TARGET CRITERIA

Characteristics of Good Criterion	<ul style="list-style-type: none"> • Clearly stated • Brief • Observable • Statement of behavior • Distinct • Written in language students understand • Shared in advance
Guidelines for Developing Criteria	<ul style="list-style-type: none"> • Limit the number of criteria; keep it to the <i>essential</i> elements of the task. • Do not try to assess everything on every task. • Remember that smaller, less significant tasks typically require fewer criteria.
Questions to Ask When Identifying Criteria	<ul style="list-style-type: none"> • Do the criteria make sense? • Can you distinguish one from another? • Can you envision examples of each? • Are they all worth assessing?

***YOUR TURN:** Brainstorm a list of characteristics of a high quality response to an open-ended mathematics problem.

***NOW:** Solve the following problem.

A group of 8 people are all going camping for three days and need to carry their own water. They read in a guide book that 12.5 liters are needed for a party of 5 people for 1 day. Based on the guide book, what is the minimum amount of water the 8 people should carry all together?

Explain your answer.

*Adapted from Assessment Training Institute, Portland, OR www.assessmentinst.com

Sample 5

14. A group of 8 people are all going camping for three days and need to carry their own water. They read in a guide book that 12.5 liters are needed for a party of 5 people for 1 day. Based on the guide book, what is the minimum amount of water the 8 people should carry all together?

Explain your answer.

$$\begin{array}{r}
 2.5 \text{ liter/person} \\
 5 \overline{) 12.5 \text{ liters}} \\
 \underline{10} \\
 25 \\
 \underline{25} \\
 0
 \end{array}
 \quad
 \begin{array}{r}
 2.5 \text{ l/person} \\
 \times 8 \text{ people} \\
 \hline
 20 \text{ liters/day}
 \end{array}
 \quad
 \begin{array}{r}
 20 \text{ liters/day} \\
 \times 3 \text{ days} \\
 \hline
 60 \text{ liters in all}
 \end{array}$$

I divided 12.5 liters \div 5 people = 2.5 liters/person.
 I did that so that I could take 2.5 liters \times 8 people
 = 20 liters/day. Now I need to multiply 20 liters/day
 \times 3 days = 60 liters to last the whole camping
 trip. 60 Liters in all.

Sample 7

14. A group of 8 people are all going camping for three days and need to carry their own water. They read in a guide book that 12.5 liters are needed for a party of 5 people for 1 day. Based on the guide book, what is the minimum amount of water the 8 people should carry all together?

Explain your answer.

$$\begin{array}{r}
 12.5 \\
 \div 5 \\
 \hline
 2.5
 \end{array}
 \quad
 \begin{array}{r}
 2.5 \\
 \times 8 \\
 \hline
 20
 \end{array}
 \quad
 \begin{array}{r}
 20 \\
 \times 3 \\
 \hline
 60
 \end{array}$$

28

$$\begin{array}{r}
 20 \\
 + 8 \\
 \hline
 28
 \end{array}$$

*Adapted from Assessment Training Institute, Portland, OR www.assessmentinst.com

STUDENT-FRIENDLY GUIDE TO MATHEMATICS PROBLEM SOLVING AT A GLANCE*

Mathematical Concepts and Procedures	<ul style="list-style-type: none"> • I understand which math operations are needed. • I have used all of the important information. • I did all of my calculations correctly.
Problem Solving	<ul style="list-style-type: none"> • I knew what to do to set up and solve this problem. • I followed through with my strategy from beginning to end. • The way I worked the problem makes sense and is easy to follow. • I may have shown more than one way to solve the problem. • I checked to make sure my solution makes sense in the original problem.
Communication	<ul style="list-style-type: none"> • I used mathematical terms correctly. • My work shows what I did and what I was thinking while I worked the problem. • I've explained why my answer makes sense. • I used pictures, symbols, and/or diagrams when they made my explanation clearer. • My explanation was clear and organized. • My explanation includes just the right amount of detail not too much or too little.

*Adapted from Assessment Training Institute, Portland, OR www.assessmentinst.com

Sample 8

A3.1.H1

Laboratory Network Program—*Alternative Assessment Toolkit*
 Activity 3.1—*Camping Trip*
 Author: Judy Arter, NWFEL

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PROBLEM SOLVING RUBRIC*

<p align="center">5</p> <p align="center">I came up with and used a strategy that really fits and makes it easy to solve this problem</p>	<ul style="list-style-type: none"> • I knew what to do to set up and solve this problem. • I knew what math operations to use • I followed through with my strategy from beginning to end. • The way I worked the problem makes sense and is easy to follow. • I may have shown more than one way to solve the problem. • I checked to make sure my solution makes sense in the original problem.
<p align="center">3</p> <p align="center">I came up with and used a strategy, but it doesn't seem to fit the problem as well as it should.</p>	<ul style="list-style-type: none"> • I think I know what the problem is about, but I might have a hard time explaining it. • I arrived at a solution even though I had problems with my strategy at some point. • My strategy seemed to work at the beginning, but did not work well for the whole problem. • I checked my solution and it seems to fit the problem.
<p align="center">1</p> <p align="center">I didn't have a plan that worked.</p>	<ul style="list-style-type: none"> • I tried several things, but didn't get anywhere. • I didn't know which strategy to use. • I didn't know how to begin. • I didn't check to see if my solution makes sense. • I'm not sure what the problem asks me to do. • I'm not sure I have enough information to solve the problem.

4. Help students to self-reflect, set goals, and give feedback.

Objectives:

- To investigate ways to foster student feedback and goal setting
- To identify a goal for engaging students in self-reflection

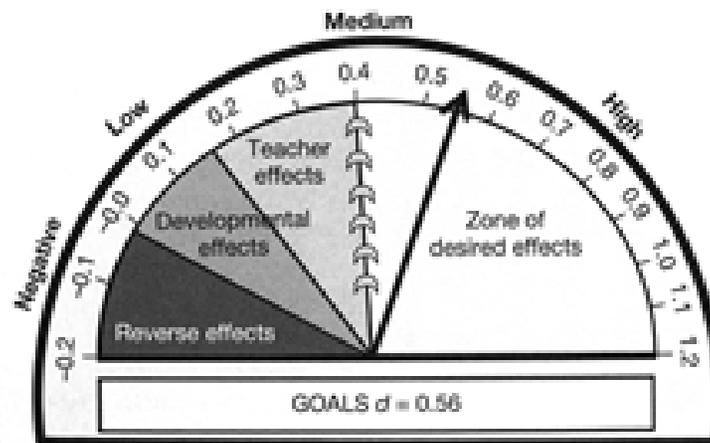
Materials:

- Slide about Hattie's barometer for goals (guide page 61)
- Slide on Four Levels of Feedback (guide page 62)
- Slide on Steps for 3-minute Conferences (guide page 63)
- Slide preparing participants for 3-minute conference (guide page 64)
- One handouts on feedback, goal setting and student reflection (guide pages 65-70)

Procedure:

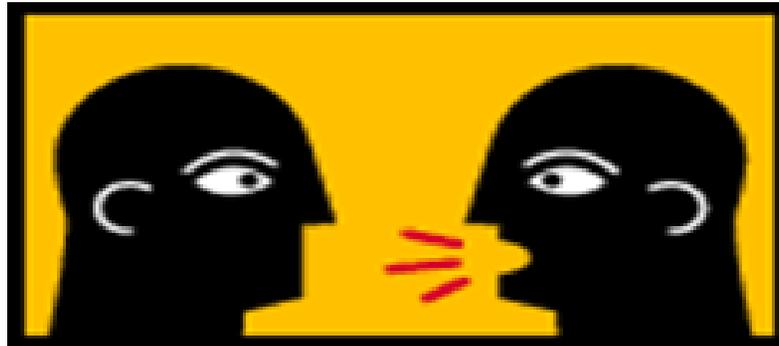
- a) Show Hattie barometer slide on goals.
- b) Distribute handout on feedback, goal setting, and student reflection to participants.
- c) Use slide to review levels of feedback and ask participants what type of feedback they usually provide to students.
- d) Use slide to review steps for a 3-minute conference.
- e) Ask participants to examine handout with template for planning feedback.
- f) Use slide to pair participants and prepare for 3-minute conference application.
- g) Ask participants to conduct a 3-minute conference.
- h) Ask participants to identify one specific way they will engage students in self-reflection or goal setting with the next instructional week and establish a day for follow-up. Teachers will share reflections after implementing targeted student goal setting-reflection strategy.

The Power of Goal Setting



KEY	
Standard error	0.057 (Medium)
Rank	34th
Number of meta-analyses	11
Number of studies	604
Number of effects	820
Number of people (7)	41,342

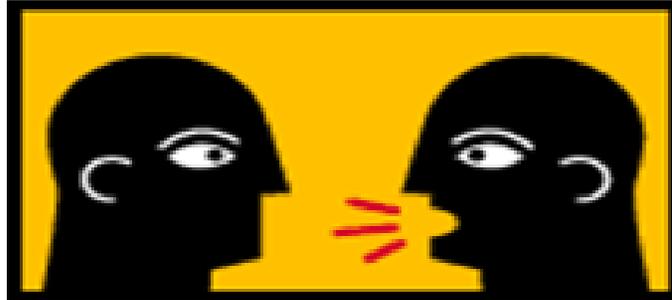
Four Levels of Feedback



- Feedback about the task
- Feedback about processing
- Feedback about self-regulation
- Feedback about the self as a person

Identify the feedback you provide most frequently and less frequently.

Steps for 3-Minute Conferences



1. Identify the focus.
2. Ask students to use a scoring guide.
3. Encourage students to use scoring guide language.
4. Offer your specific feedback—add/modify
5. Ask students to consider feedback and decide on next steps.
6. Encourage students to use each other for feedback.

Feedback, Self-Assessment, & Goal Setting

- Identify partner.
- Person with longer fingers is “Partner A”; shorter fingers-“Partner B.”
- Use *Problem-Solving Rubric*.
- Partner A—You are the Sample 8 student. Prepare for your conference (use the language of the problem-solving scoring guide) to identify your strengths and problems. Write on handout, under “My Opinion”
- Partner B—You are the teacher. Prepare to conference with Partner A about his/her solution. Write the strengths and problems on sticky notes.
- Conduct a 3 minute conference.

FOUR LEVELS OF FEEDBACK

Hattie, J., & Temperley, H. (2007). The power of feedback. *Review of Educational Research*, 77, 81-112

Feedback about the Task...	<ul style="list-style-type: none"> • Includes information about errors—whether something is correct or incorrect • Incorporate information about the depth or quality of the work, often against implicit or explicit criteria • May include a need for more information • Is more powerful when it corrects misconceptions than when it alerts students to lack of information.
Feedback about the Processing...	<ul style="list-style-type: none"> • Gives information about how students approached the task • Provides information about the relationship between what a student did and the quality of the performance • Suggests possible alternative strategies that also would be useful • Scaffolds transfer
Feedback about Self-Regulation ...	<ul style="list-style-type: none"> • Concerns the process students use to monitor and control their own learning • Can lead to students seeking, accepting, and acting on feedback information • Develops students' confidence as learners • Encourages metacognition—thinking about thinking
Feedback about the Self as a Person...	<ul style="list-style-type: none"> • Is generally not a good idea • Does not contain information that can be used for further learning • Implies that achievement is something beyond students' control • Leads to a kind of academic fatalism

STEPS FOR THREE-MINUTE FEEDBACK CONFERENCES*

1. Identify the focus of the feedback.
2. Ask students to use a scoring guide or whatever description of quality you have taught to identify what aspects of quality are present in a particular piece of work.
3. Encourage students to use the language of the scoring guide.
4. Offer your *specific* feedback and add or modify what the students to work on, if needed.
5. Ask students to consider feedback and decide what to do next. Help students to focus their plan and goals.
6. Encourage students to use each other as feedback providers.

*Adapted from Assessment Training Institute, Portland, OR www.assessmentinst.com

SAMPLE FEEDBACK TEMPLATE*

NAME: _____ ASSIGNMENT: _____ DATE: _____

MY OPINION



My strengths are



What I think I need to work on is

MY TEACHER'S OPINION



Strengths:



Work on:

MY PLAN



What I will do now:



Next time I'll ask for feedback from: _____

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Sample 5

14. A group of 8 people are all going camping for three days and need to carry their own water. They read in a guide book that 12.5 liters are needed for a party of 5 people for 1 day. Based on the guide book, what is the minimum amount of water the 8 people should carry all together?

Explain your answer.

$$\begin{array}{r} 2.5 \text{ liter/person} \\ 5 \overline{)12.5 \text{ liters}} \\ \underline{10} \\ 25 \\ \underline{25} \\ 0 \end{array}$$

$$\begin{array}{r} 2.5 \text{ l/person} \\ \times 8 \text{ people} \\ \hline 20 \text{ liters/day} \end{array}$$

$$\begin{array}{r} 20 \text{ liters/day} \\ \times 3 \text{ days} \\ \hline 60 \text{ liters in all} \end{array}$$

I divided 12.5 liters \div 5 people = 2.5 liters/person.
 I did that so that I could take 2.5 liters \times 8 people
 = 20 liters/day. Now I need to multiply 20 liters/day,
 \times 3 days = 60 liters to last the whole camping
 trip. 60 Liters in all.

Sample 7

14. A group of 8 people are all going camping for three days and need to carry their own water. They read in a guide book that 12.5 liters are needed for a party of 5 people for 1 day. Based on the guide book, what is the minimum amount of water the 8 people should carry all together?

Explain your answer.

$$\begin{array}{r} 12.5 \\ \div 5 \\ \hline 2.5 \end{array}$$

$$\begin{array}{r} 2 \\ \times 12.5 \\ \hline 25 \\ 250 \\ \hline 2500 \end{array}$$

$$\begin{array}{r} 12.5 \\ + 12.5 \\ \hline 25 \end{array}$$

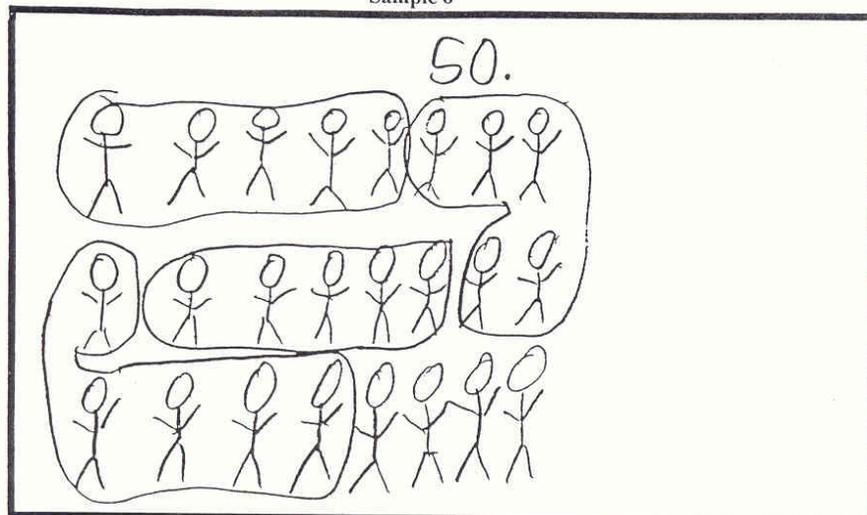
$$\begin{array}{r} 24.5 \\ + 4 \\ \hline 28.5 \end{array}$$

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Sample 8



A3.1,H1

SAMPLE TEMPLATES FOR SELF-REFLECTION AND GOAL-SETTING*

Problem	Learning Target	Right?	Wrong?	Simple Mistake?	More Study?
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
My Strengths:					
My Highest Priority for Studying:					
What I Need to Review:					

Goal	Steps	Evidence
What do I need to improve?	How do I plan to do this?	What evidence will show I've achieved my goal?
Time Frame: Begin _____ End _____ Date _____ Signed _____		

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Fostering Self-Reflection and Goal Setting

Teacher's Name...

What I will teach...

Target date for implementing strategy...

How I will engage my students in self-reflection and goal setting...

My students' response to the self-reflection and goal setting experience...