

CHAPTER 3

Formative Assessment Prior to Instruction



How does a teacher plan more effective instruction? In *The 7 Habits of Highly Effective People*, Stephen Covey (1989) explains the benefits of putting first things first: to allow us to focus on the important outcome and then devise the steps necessary to get there. This practice is equally beneficial in the classroom. Rather than habitually following a prescribed lesson plan, teachers need to focus on the learning outcomes we intend our students to achieve and use these goals to drive instruction. Pre-assessment is the means we use to chart the initial course.

The Power of Pre-assessment

Pre-assessment is a routine part of most people's jobs. Before ordering inventory, a store owner will first find out what items have been selling and how well. Car mechanics perform diagnostics on an engine before trying to fix that funny noise it's making. Dentists take X-rays to assess teeth before deciding to drill. And doctors check blood pressure, pulse,

and weight and ask a slew of questions before deciding what action to take with a patient. Yet teachers frequently begin instruction without performing any kind of pre-assessment of their students' knowledge or skills.

Teachers need information to make accurate diagnoses and prescriptions for learning. Finding out what students know before beginning instruction allows teachers to focus teaching on what students haven't yet learned, avoiding redundancy. Pre-assessment results can also guide teachers in determining the level of challenge and difficulty each student needs and what the final individual learning targets should be. Customizing instruction makes it more relevant, engaging, and motivational for the individual learner. Pre-assessment is key to effective instructional design, and it is the first and most crucial step in using formative assessment. After all, how can we measure growth in learning without knowing the starting point? Let's examine some specific uses and benefits of formative assessment conducted prior to instruction.

Clarification of Prior Knowledge and Skills

A pre-assessment of knowledge and skills can be formal or informal. Pre-tests, a more formal measure, have been around for a long time and can be used to quickly determine a student's background knowledge. For example, if I were teaching a class on the content of this chapter, I might use a binary-choice pretest that looks like this:

Mark each statement as true or false.

1. I feel confident in my ability to measure students' knowledge, skills, and attitudes at the beginning of a unit of instruction. T F
2. I know of at least three strategies for pre-assessing students' knowledge, skills, and dispositions. T F
3. Once I have pre-assessed my students, I am able to use that information in my instructional practices. T F

A Likert-style scale format would also be appropriate.

In the lesson following this pre-test, I would use the information gleaned to adjust my instructional design and content. If most students self-reported that they were knowledgeable and confident about the pre-assessment

process, I would focus on extending and deepening their basic knowledge, and I would purposefully incorporate formative assessment throughout instruction. If the pre-test indicated students had limited understanding of pre-assessment, then I would begin by focusing on foundational knowledge and formatively measure students' understanding before asking them to apply their knowledge, use it in higher-level thinking, or take a summative test.

Let's consider some other examples of pre-testing. Mr. Nelson, in his high school civics class, uses a pre-assessment to determine his students' knowledge of the Bill of Rights. Before he begins teaching this unit, he wants to find out how many of the rights they know and what they understand about them. Mr. Nelson's civics pre-test looks like this:

1. Which of these foundational documents of American history came first?
 - a. The Constitution
 - b. The Declaration of Independence
 - c. The Bill of Rights
2. Which one of these is not in the Bill of Rights?
 - a. Freedom of religion
 - b. The right to bear arms
 - c. The pursuit of happiness
3. If you could have only three rights in the Bill of Rights, which would you choose and why?

Mrs. Peterson uses pre-testing in her middle school two-dimensional art class. Before she starts a unit on art history, she distributes the following pre-assessment:

1. Name three famous painters and their style of work, such as abstract, Impressionist, or pop art.
2. What are three factors that influence an artist's work?
3. Select one of the painters you listed and explain what you know about their time period, style, and medium.
4. Describe the differences between watercolor, acrylic, and oil paints.

Both Mr. Nelson and Mrs. Peterson can use the data these tests generate to decide how to adjust the content and depth of their instruction and to set individual and class learning goals. Later in the chapter, I'll discuss other pre-assessment strategies that can provide similar snapshots of prior knowledge and skills.

Insight into the Depth of Prior Knowledge

In addition to showing the breadth of what students know, pre-assessments can be designed to reveal students' depth of understanding, which is an important piece of information to have when designing instruction. Look, for example, at the third question of Mr. Nelson's civics pre-assessment, asking students which three rights they would choose to have and why. It is set up to tell Mr. Nelson not only *if* students can name three rights beyond the two listed in question #2 but also how well they understand why those rights were formally enshrined. In this case, he learns that while all 16 of his students could name the 3 rights they valued most, only 5 were able to expand on their choices with well-thought-out reasons. He interprets the data to mean that his students have good baseline knowledge of the Bill of Rights and he ought to focus his instruction on comprehension, application, and analysis.

Here are some other questions Mr. Nelson might use on a pre-assessment to gain insight into the depth of students' prior knowledge and help him decide how best to structure his unit:

1. Under the First Amendment, which of the following are allowed, and why? A newspaper article describing charges of mayoral breach of ethics; publically calling the principal a liar; a Facebook update stating that a friend is "a slut."
2. Which First Amendment right do the following actions proceed from? Holding an anti-war protest in front of the White House; a town's decision to set up a Nativity scene in front of Town Hall but not a menorah; police officers needing a search warrant before entering a person's home.
3. Review a series of newspaper articles and identify instances of First Amendment rights being protected or abused.
4. Describe a world without one of the rights now enshrined in the First Amendment.

Identification of Predispositions, Values, and Beliefs

Students have different backgrounds and experiences that influence learning. Some have fixed beliefs that may affect how they receive instruction. For instance, students who have been exposed only to creationism may be confused by or resistant to instruction on evolution. Similarly, students who have experienced a traumatic family event may bring a different perspective to novels such as *The Memory Keeper's Daughter* or *The Secret Life of Bees*.

Identifying students' predispositions, values, and beliefs, however, requires a different type of pre-assessment than a pre-test designed to measure knowledge and skills. To elicit these less quantifiable and more sensitive pieces of information, employ open-ended questioning techniques that invite students to express their ideas. For example, prior to asking students to read a novel that features the effects of divorce on a teenager, an English teacher could ask students to complete an open-ended sentence such as, "Some of the ways that divorce affects people's lives include _____." Or a teacher might give students a fill-in-the-blank question to reveal differences between values at home and at school: "It's easy to get confused between what is taught at school about (_____) and what I have learned about this topic at home." For some students, a pre-assessment that asks them to draw a picture of or otherwise illustrate their ideas about a more sensitive subject can provide illumination to both teacher and student.

Identification of Prior Learning Sources

Knowing where students got the information they currently possess about an upcoming topic of instruction can help ensure effective instruction designed to address and correct misinformation that could derail learning. The Internet and social networking, for example, have become primary resources for students, and the reliability of some online sources is certainly up for debate. A teacher who discovers that students rely heavily on less trustworthy sources might make effective research practices a specific point of instruction. Consider the example of Mr. Fey. While explaining to a class that Wikipedia and blogs are not acceptable resources,

he spontaneously asks his students where else they might look for information online. A few students researching breakfast cereals mention that they are using a cereal company's Web site as the source for claiming that a certain cereal (one with a high proportion of brightly colored marshmallows) is a good source of fiber and antioxidants. This comment prompts Mr. Fey to circle back and launch a mini-lesson on "search savvy": how to look at source, content, and accuracy in an objective manner. Notice that this pre-assessment was not planned and that the teacher uses the data that emerge from it to make an on-the-spot instructional response.

Guidance on Goal Pursuit and Attainment

Pre-assessment can provide a common guide for pursuing and reaching goals. With her students about to embark on a long-term research project, Miss Morris maps out each stage of the project into parts. Her intent is to incorporate reference and citation skills into the project from the start, and she explains to students that each of them will be compiling an annotated bibliography of their sources. She explains how to go about this and shares exemplars. As students work on their projects over the next two weeks, Miss Morris checks in on the bibliographies taking shape. Those who are struggling with the process and product work with Miss Morris to learn more about bibliographies, identify resources, and practice their skill in describing sources.

Cognitive Preparation for Learning

Cognitively, formative pre-assessments have several advantages. Brain research shows that the activation of prior knowledge promotes the brain's ability to make connections to new learning and improve comprehension. It is the brain's natural mechanism to try to fit new learning into existing knowledge. Besides calling up prior learning, pre-assessment can also encourage reflection, which supports the organization of thinking and extension of understanding. Additionally, emerging research on memory shows that information is best remembered when it is actively or emotionally processed. Many of the informal pre-assessment strategies I'll present promote this kind of student engagement. The strategies also

help teachers to get students' attention, which, according to Eric Jensen (2000), is important at the beginning of teaching and pre-assessments.

REMEMBER

Use formative assessment prior to instruction to

- Determine student's incoming knowledge and skill levels
- Reveal students' depth of knowledge
- Illuminate students' incoming attitudes, dispositions, and beliefs
- Identify sources of incoming information
- Guide student and teacher planning
- Clarify the gap between current and desired achievement levels
- Prepare students' brains for learning

Strategies and Tools for Assessing Prior to Instruction

There is a wide variety of innovative and engaging strategies and tools that support formative pre-assessment. I have chosen four especially effective and versatile ones to highlight here: *Entrance Slips*, *Corners*, *Gallery*, and *sticky notes*. Additional strategies, with brief explanations, are provided in Appendix B.

I encourage you to experiment to see which approaches work best for you and your students. Every class and every teacher is unique, and what works in one classroom or subject may not work in another. You'll discover that the strategies are flexible and that one may lend itself to different applications at different points in instruction. For example, some pre-assessments may also be used formatively during or even after instruction.

It's important to keep in mind that these early formative assessment activities are most effective when they are ungraded, brief, nonthreatening, connected to content and standards, and targeted toward instructional improvement. The goal of pre-assessment is to gather information, not intimidate students or embarrass them. In the pages to come, I provide

some hints for making the strategies feel less threatening, and some of these strategies have these characteristics built in.

Entrance Slips

An entrance slip is a student's response to a question a teacher poses related to the upcoming instruction. For example, a teacher might ask, "What's the relationship between *A* and *B*?" or, "What do you find confusing about *C*?" and then ask students to write their answer on a piece of paper. An Entrance Slip activity should take only a few minutes at the beginning of a period of instruction. Teachers can ask students to sign the slips or to submit them anonymously (or with randomly assigned numbers), if responses are to be publicly posted or discussed as a way to ease into the topic and gain further information about prior knowledge. Especially when shared, entrance slips can pique students' interest and, at the same time, give teachers feedback on students' current levels of understanding, their higher-level thinking skills, or their personal beliefs. As we know, this is critical information for differentiating and customizing instruction.

I like to hang on to entrance slips and return them to students at the conclusion of the unit of instruction. At that point, they serve as a measure of learning and help students to self-assess and reflect the achievement they've made.

In practice: Before beginning a unit on presidential elections one year, Mr. Walker asks students in his civics class to submit an entrance slip response to a question about how the president is elected:

Which of the following is true?

- Presidents are elected by a majority vote of the people.
- Presidents are elected by a group of selected representatives.

Pick one:

- Each state has two members of the Electoral College.
- Each state has the same number of Electoral College members as it has members of the House of Representatives in Washington, D.C.

When Mr. Walker collects the slips, he finds that most students believe that the president is chosen by the popular vote alone. In response to this information, he decides to devote more instructional time to the basics of the election process.

During the following year, a presidential election year, the election process is much discussed in the media. When Mr. Walker uses an Entrance Slip activity to find out what the new group of students knows about presidential elections, he finds that most of them are familiar with the popular vote and know about the Electoral College. Mr. Walker adjusts his instructional plans accordingly. After a relatively brief review of the election process, he moves on to an application-focused activity, giving students the choice of writing to Congress to share their thoughts about the election system or staging their own mock election with popular and delegate voting.

Teachers can also use this strategy to gather information about students' belief systems. For example, before Ms. Marsh assigns her English students *The Kite Runner*, she asks them to complete the following entrance slip:

1. What are three words that come to mind when you think of Afghanistan?
2. How would you describe the relationship between betrayal and forgiveness?

The first question is a way to begin uncovering students' prior knowledge and predispositions about Afghanistan's history and culture. Ms. March asks about students' understanding of betrayal and forgiveness so that she can get a better idea of the values, belief systems, or possible stereotypes they will bring to the reading of the book.

Based on the data collected through these slips, she decides on a follow-up activity that will focus her students' attention on the lives of Afghani people. First, she posts pieces of paper on which she's printed "Media Images of Afghanistan," "Human Rights in Afghanistan," and "History of Afghanistan." Then, she asks students to move throughout the room and list on these pieces of paper things they know or believe to be true about the topic. Their responses suggest to Ms. March that the media has had a powerful effect on students' ideas about Afghanistan and that many of them think of it mostly as "a country of terrorists." She decides

that before her students read *The Kite Runner*, they'd benefit from a more nuanced perspective, and so she arranges to bring in a guest speaker who lived in Afghanistan for many years. This, she hopes, will help open the eyes of students who have a very narrow view of the country. She also believes the guest speaker will be interesting to the handful of students who have a bit more background knowledge of the topic and increase their engagement with the novel.

At the start of his health unit on obesity, Mr. Gianni uses the Entrance Slip strategy to find out what students might know or want to know about the topic. He encourages students to ask questions based on what they have heard at home or in the media. Asking students to pose their own questions is an especially relevant strategy for topics that have high visibility in the media and about which the media may give out both powerful messages and incorrect information. Mr. Gianni's pre-assessment looks like this:

List three causes of obesity, and write a question you have about each cause.
Here are some hints: consider genetics, lifestyle, exercise, food choices, etc.
Sample question: *Why do my sister and I eat almost the exact same foods, but our weights are very different?*

Based on the entrance slips, Mr. Gianni finds that his students have different levels of knowledge about obesity and that he'll need to cover both general information and more advanced material for students who already have a good baseline understanding of the topic. He opens the unit with a PowerPoint overview of the topic and then divides students into two groups based on the accuracy of their understanding of obesity. To students who still need more fundamental understanding, he assigns a vocabulary-building exercise focusing on terms essential for understanding, such as *metabolism* and *BMI*. Students who showed more depth in their understanding he asks to debate the question of who bears the responsibility for obesity: the individual, the family, the media, or corporations. He also asks this group to compile a list prioritizing these groups from most to least responsible based on their discussion. This example illustrates how entrance slips can help a teacher differentiate assignments.

REFLECT AND APPLY

Here are some sample Entrance Slip questions for a range of content areas. How might the responses they generate contribute to the teacher's understanding of students' knowledge and skills? Their attitudes and beliefs? How might a teacher use the resulting data to inform instructional plans?

- *Math:* What does slope measure, and where is it used in real life?
- *English:* What do you think the protagonist will do next?
- *Science:* Our last class focused on the causes of global warming. What part of our last discussion did you understand *most*? What part did you understand *least*?

- *Spanish:* What do you know about Cinco de Mayo?
- *Art:* Which Impressionist painter do you like best, and why: Cezanne, Renoir, or Monet?

- *Interdisciplinary:* If the ocean levels rose 10 feet today, how would your life change?

Your turn: Think about your own classroom and how you might frame and use an entrance slip for a particular unit of study.

Corners

Corners gives teachers a quick and visual way to preview what their students may know or believe before instruction begins. For this strategy, the teacher chooses a question that reflects the content of the upcoming instruction and labels corners of the room with possible answers, one answer per corner. The teacher then asks the students the question and tells them to go to the corner with the label that best matches their answer. As the teacher takes note of where the students go, the members of the group collaboratively record statements or arguments to support this point of view or belief. These are additional data that the teacher can examine and consider when designing the upcoming lesson.

Because student answers are more public in this pre-assessment strategy than entrance slips, teachers need to be sensitive to individual students who may be less comfortable making a public statement. Collecting individual written notes and votes in a corner can address this concern. Instead of asking students to stand in a corner, teachers can ask them to sign their name at a selected corner or write a response on a posted paper in the corner.

Corners also can serve as an assessment at other points in instruction, but as a pre-assessment it gives both teachers and students useful information. Teachers get individual and whole-class baseline measures of student knowledge and dispositions. As the students work together to support their corner “choice,” teachers can gather information about students’ higher-order and critical/evaluative thinking on a topic. For students, the Corners strategy prompts them to reflect on what they know or believe about a topic and, when prompted, to supply supporting evidence and evaluate the accuracy of that knowledge or opinion.

Please note that Corners can be adapted to any number of possible answers to a question. You can use two corners for two-sided issues, such as whether or not cell phone use should be allowed in school, whether or not cloning is ethical, or whether ethanol is good or bad for the environment. You can also expand the strategy to four corners to accommodate questions with four possible answers: Which of the four primary candidates would you choose for president? You could even make corner labels that reflect levels of agreement with a statement, like a Likert-style scale, so students can place themselves on a continuum of possible answers.

In practice: At the beginning of a unit of study on global warming, Mrs. Jones tapes long sheets of newsprint paper in the four corners of her classroom. She writes a different heading on each sheet—“Automobiles,” “Deforestation,” “Manufacturing Plants,” and “Nonhuman Factors”—and then launches the activity by asking students to go to the corner of the room labeled with what they think is the biggest contributor to global warming. There, they are to generate a list of what they know about the problem. After a five-minute brainstorming period, each group shares its list with the rest of the class. The distribution of her students in the room’s

four corners indicates to Mrs. Jones that her students see global warming as equally attributable to human and nonhuman factors; however, the groups of students reporting out on human factors are expressing themselves with a great deal of passion, and the entire class is listening intently. Mrs. Jones decides to build on this engagement and begin her instruction with a look at the human causes of global warming.

This type of foundational assessment can also point the way to numerous instructional strategies that a teacher may use, such as a PowerPoint lecture, an Internet research project to check the accuracy of the statements generated by the group, or a group or individual research project on specific facts, truths, and essential understandings of the topic.

Ms. Gough also uses Corners to pre-assess her psychology students. She labels three corners in her room as “Agree,” “Disagree,” and “Unsure.” She then asks her psychology students to go to the corner that best matches their response to statements about parenting, which she reads aloud. These include assertions such as “Spanking is an effective way of disciplining children” and “Women are better than men at child rearing.” After the students go to their selected corners, they discuss among themselves their reasons for going there. Ms. Gough then asks the members of each group to explain to the other groups why they selected their corner. Listening to these reports, Ms. Gough learns that almost all of her students view spanking as ineffective, and she makes a note to minimize formal lecture on this topic. Instead, she’ll simply reinforce this belief by showing a brief video focused on alternative discipline strategies. She also learns that the majority of the class believes women are better at parenting than men and makes a note to emphasize issues of gender and parenting in her upcoming instruction.

As an introduction to a lesson on ethics, Mr. Wilson uses masking tape to create a line across the width of the classroom and asks students to place themselves on the continuum in a manner that reflects their degree of agreement with the statement “Lying is OK.” Standing at the far left of the line, he explains, is how they should indicate “I think lying is never OK.” The farther along the line students place themselves, the greater their agreement that lying is an acceptable behavior. Then Mr. Wilson asks

the students to reorder themselves on the line to show the amount of lying that they regularly engage in. A discussion ensues on what is a lie, why people lie, and when, if ever, lying is acceptable. Noting where his students position themselves and listening to their comments, Mr. Wilson concludes that most of them are at the early level of the conventional state of Kohlberg's moral development. The topic lends itself to a social-learning approach, and Mr. Wilson decides to incorporate discussion of case studies into his upcoming lessons in order to move students along to a deeper understanding of conventional reasoning and post conventional thinking. Afterward, he'll have the class review and discuss a research study reporting that although most students admit to cheating in school, most students also believe cheating is wrong.

REFLECT AND APPLY

Here are some sample questions from different content areas that would work well with the Corners strategy. How might the responses they generate contribute to the teacher's understanding of students' knowledge and skills? Their attitudes and beliefs? How might teachers use the data generated to inform instructional decisions?

- *Math*: Should the United States use the metric or English system of measurement?
- *World Language*: Which language should be the second language of the United States: Spanish, French, Chinese, or something else?
- *Language Arts*: Do you prefer to access a book through written, audio, or video versions?
- *Career Choices*: What is most important to you: money, personal satisfaction, getting recognition, or being the best?

Your turn: Think about your own classroom and the units of study you teach. How might you use Corners as a pre-assessment strategy?



Gallery

When used as a pre-assessment, the Gallery method, like Corners, gives teachers and students a visual picture of student knowledge and skills or viewpoints. The idea of this strategy is to make a display, or gallery, of student responses to a teacher-generated question. All forms of responses can be considered here: images, computer graphics, single words or phrases, drawings, and so on. Sometimes Gallery is called Graffiti Wall; this name conveys the self-expression that this strategy can encourage as well as its typical logistics: having students record their response on a common sheet of paper. However, don't let the self-expressive association discourage you from using Gallery in a class that's usually not associated with self-expression. It is just as applicable in a statistics or physics class as it is in a fine arts or language arts class. Gallery can be used to capture student knowledge of everything from math problems to multicultural issues.

As with other types of pre-assessments, Gallery submissions can be posted with the creator's name, posted with a code number that identifies the creator to the teacher but not to other students, or posted anonymously. Names or codes provide data for subsequent grouping; anonymous responses are well-suited for whole-class discussion of the gallery, an approach that gives everyone the opportunity to work collaboratively toward an understanding of the material. Anonymous submissions are a particularly good idea when the material or topic is new and it's likely that most students will have limited background knowledge.

In practice: To start a unit about graphs and charts, Mrs. Zakari posts one problem and asks students to solve it on a piece of paper, which she will collect and review. Mrs. Zakari knows that her students have encountered graphs and charts in past instruction. Her plan is to go more deeply into design and creation. She also wants students to understand why particular chart or graph formats are suited to particular data sets. So she begins with a question that she believes most students will answer easily: *Where have you seen charts and graphs used in the real world?*

Mrs. Zakari collects students' anonymous responses and quickly sorts them into categories (e.g., "in the newspaper," "at school"). Then, being clear that there will be no grade involved, she asks students to draw one

of these charts or graphs they have seen as accurately as possible. They respond with all kinds of illustrations, taping them to the class whiteboard and then participating in a whole-class brainstorming session focused on the various data that could be gathered about them and their school and how those data could be communicated. The knowledge her students display tells Mrs. Zakari that most of them know about pie charts and bar graphs but are less clear on why or when to use them. She will use this pre-assessment information to plan a strategy for the upcoming unit.

To make a Gallery activity more engaging and interesting, teachers can decorate the paper or wall where students post their work. They can make the area look like graph paper, a forest of trees, or another image that relates to the topic. For example, at the start of a sociology unit on understanding cultural similarities and differences and the wide range of factors that influence cultures, Mr. Velez gives each of his students a piece of paper that looks like a brick. He asks students to share a belief, icon, or ritual from their own or another culture by writing it on their “brick.” Students put their names on the back of their bricks, and he collects and reviews the submissions—to gain insight and ensure appropriateness—before posting them on the wall. Together, the class builds a multicultural graffiti wall, and students do a walk-through to review all the postings. Just in that tour of their wall, students learn a great deal about cultural variation.

Following their tour, Mr. Velez encourages students to ask questions about things they want to learn more about. The discussion leads to a K-W-L activity, during which Mr. Velez makes discreet notes about topics that seem to interest his students and about which of his students know about specific cultures. The former information he can use to sharpen his instructional plans and provide interest-based hooks; the latter information he can file away and use to elicit comments whenever a discussion of particular cultures comes up or when he wants to set up small groups with a heterogeneous or homogeneous cultural perspective. As the activity continues, Mr. Velez also concludes that the members of this class know a great deal about their own cultures and little about the cultures of others, but they are curious to learn more. This positive attitude is encouraging.

Here's another example of the Gallery strategy in practice. Miss Agosta, a new English teacher, keeps trying new ways to get her students excited

about reading novels. She knows they have read lots of fiction over the years but have sometimes struggled to relate to the characters or engage in the plot. She decides to try a Gallery display.

Her first step is a Quickdraw activity. She asks the students to graphically illustrate their favorite novels, sign their names, and post their illustrations. Miss Agosta takes note of the various genres of these favorite novels and uses this information to quickly separate the students into interest-based groups: science fiction, mystery/thrillers, romance, historical novels, and so on. Next, each group summarizes their genre's key elements: its general approach to plot, place/setting, characters, and conflict. While they are working, Miss Agosta posts four pieces of chart paper throughout the room, each headed with one of the four key elements: "Plot," "Place/Setting," "Characters," and "Conflict." At her signal, group members move about the room, adding relevant characteristics of their genre under these element headings.

The International Reading Association has a standard that requires students to create an original story based on synthesis of other novels. This Gallery display provides the foundation for each group to create as far-fetched and improbable a story as they could, while still clearly showing the four elements. Here, the strategy of starting with an individual display of a novel illustration and following with a summary and identification of elements shows how a pre-assessment can blossom into an ongoing process of assessment for learning.

REFLECT AND APPLY

Gallery is typically a fun and engaging pre-assessment. Here is a list of ways teachers in different content areas might use this strategy. How might the responses they generate contribute to the teacher's understanding of students' knowledge and skills? Their attitudes and beliefs? What kind of information would each of these generate? How might it inform instruction?

- *Literature:* Write all the vocabulary you know that relates to or describes poetry on paper cut into leaf shapes. Extend this by adding words (leaves to the tree) as the poetry unit progresses.

- *Math:* Illustrate uses of right angles in the real world.

- *Marketing:* List the best and worst ads you have seen. Follow up by analyzing why.

- *Art:* Critique the modern artists Salvador Dali, Andy Warhol, Jackson Pollock, and Piet Mondrian. Next to a painting by each, note your thoughts.

Your turn: Think about your own classroom and how you might frame a question to generate a Gallery display related to a particular unit of study. What would students' responses tell you about their prior learning, skill levels, and beliefs?



Sticky Notes

Sticky notes support a variety of assessment techniques involving signaling, sorting, and analysis. Students can use these slips of paper to communicate their starting knowledge and understanding, data teachers can then use to engage students in a lesson or to revise upcoming instructional plans, adding review activities, changing content, adjusting pacing, and so on. Sticky notes are also a great tool for uncovering students' analytical abilities. And because the use of sticky notes often involves movement, these activities are a good option for kinesthetic learners.

In practice: Let's take a look at four strategic ways to use sticky notes: for signaling, for sorting, for engagement, and for analysis.

For signaling. Teachers can put a red and a green sticky note back to back and give one of these two-sided notes to each student. After the teacher introduces a new concept, students can hold up the note with either the green side or the red facing the teacher to indicate whether they know something about the topic or not. Based on these responses, the

teacher can move forward with instruction or decide to spend more time on the concept until more students achieve the desired level of mastery. (As we'll discuss further in Chapter 4's look at formative assessment during instruction, teachers must decide the number of students required to "get it" before instruction can proceed and which intervention to use for those who "didn't get it.") If anonymity is a concern, there is the option of having students close their eyes before they hold up their colors. Teachers can also have students leave the green side up in front of them on their desks and then discreetly turn over the note to the red to signal the teacher that they need more help. Using this strategy is a very quick way for the teacher to gather data to inform the next instructional steps.

For example, in Spanish class, Mrs. Mendez asks her students to keep their flippers (her word for the back-to-back red and green sticky notes) on their desks. As she introduces new vocabulary, students raise their red flipper if they have a question or to signal that they need repetition of the word.

For sorting. Another way teachers can use sticky notes to gather pre-assessment data is to ask students to write things they know about an upcoming topic on notes and then post these notes on a larger display board in ways that group or organize the information. Larger-size notes written on with markers are more effective for group viewing.

There are many variations teachers might try. Mrs. Berry uses sticky-note sorting to find out what students in 7th grade Family and Consumer Sciences know about fruits and vegetables before she begins her lesson on botanical categories. She gives students prepared sticky notes on which she's written the names of various fruits and vegetable. Students then must decide whether to post the note on a piece of chart paper labeled "Fruit" or on one labeled "Vegetable." The sorting generates some interesting conversation on whether tomatoes are fruits or vegetables and tells Mrs. Berry what information she should focus on in her lesson. After the lesson, she asks students to re-sort the fruit sticky notes into pones, drupes, seeds, melons, and citrus and the vegetable notes into roots, stems, flowers, leaves, seeds, and tubers. This visual display remains up throughout the unit to support discussion of differences in cooking techniques for tubers versus leaves, as well as instruction about nutritional values.

For analysis. On the taxonomy of learning, analysis is in the upper part of the pyramid. Sticky notes can be used prior to planned instruction to elicit evidence of students' analytical ability. For example, information can be broken down into parts, classified by attribute, prioritized, or compared and contrasted using multicolored slips. All approaches will serve to identify incoming gaps in knowledge.

To gain insight into the analytical thinking level of students in his American studies class, Mr. Rossi asks them to think about the best way for schools to go about educating students. He prompts them to think about how they learn and how schools can do the best job of teaching all children. Students write their responses on sticky notes.

Notice that Mr. Rossi chooses to approach this pre-assessment task via a subject he's sure all his students know well: school and the experience of being a student. After students have responded, he explains that cognitive systems focus on teaching to the head (i.e., knowledge, thinking, problem solving), behavioral systems focus on reward and punishment, and sociocultural systems factor in all the influences on learning and behavior that students bring to school from their larger world and that affect the culture of a school. When he's finished his explanation, he asks the students to sort their sticky-note responses into the category they believe is the best match by posting the notes on one of three pieces of poster board. This posting activity gives Mr. Rossi insight into students' higher-level analysis skills—that is, their ability to sort information by category.

In Mrs. Sanchez's class, students are working on a preliminary unit on multiple intelligences prior to selecting long-term research topics. Based on a series of questions, they identify their own strengths and skills on sticky notes and then sort them into each of Howard Gardner's multiple intelligences (MI). This can help students set the stage for a study of MI using very concrete examples. Once students identify their own types of intelligence, they use this information to design their projects in very personalized ways.

For engagement. Sticky notes can also be used to ensure that every student makes a contribution to the pre-assessment activity (or any activity, for that matter). A teacher could use them, for example, to elicit input from all students on their priorities for a particular unit of study. Mr. Wang

expects the students in his business class to select a business career that they want to learn about. They write their ideas on sticky notes and post them on a brainstorming board. The ideas can be grouped by the type of job such as financial, creative, technology related, and so forth. Mr. Wang then uses this information to decide which careers to study as a whole class and which to assign to individuals. If a majority of the students want to learn more about artistic directors and marketers, but only a few want to learn about accountants and actuaries, Mr. Wang can respond accordingly.

Considering that they're nothing more than slips of paper with a little adhesive, sticky notes are a surprisingly powerful tool. Their key strength is their versatility and their ability to support many other formative assessment strategies in the lexicon. Teachers can use them as graphic organizers for color-coding objects or ideas that belong together, or they can use them for voting. I will discuss these uses and others in the next chapter on using formative assessment during instruction.

REFLECT AND APPLY

Here are some suggestions for using sticky notes in various content areas. How might the data generated contribute to the teacher's understanding of students' knowledge and skills? Their attitudes and beliefs? How might a teacher use the resulting data to inform instructional plans?

- *Reading:* Highlight text with color-coded strips. Label examples of symbolism or where the author shows point of view. Note page number and post/compare with others.
- *Science:* Ask students to sort bones into long and short by labeling on color-coded notes.
- *Interdisciplinary:* Post a main idea or concept and have students add color-coded notes. Add arrows and lines to show relationships.

Your turn: What are some ways you might use sticky notes to pre-assess students' knowledge, skills, or beliefs in your own classroom?



Responding Instructionally

Teachers have many options for responding to information from pre-assessments. But before responding, it's essential to organize and analyze the data collected so that you have the most accurate picture of what the class already knows, doesn't know, and needs to work on. These data will support decisions about how to adjust instruction to improve learning outcomes. In this section, I have listed several key questions to guide your work with pre-assessment data. Note that these questions can also be asked, with some adaptation, to guide the instructional decision making related to formative assessment during and after instruction (see Chapters 4 and 5).

Ask Yourself: What Information Do I Have? What Does It Mean?

The first set of questions focuses on data and data interpretation:

- What does the information from the pre-assessment mean? How do I interpret it?
- Does the information shed light on students' mastery of facts or skills?
 - Does it provide insight into their beliefs or dispositions?
 - What attitudes or levels of understanding, proficiency, or mastery do my students currently demonstrate?

Organizing pre-assessment data into a chart or table is a good way to gain an overview of students' knowledge or skill levels. For example, Ms. Dix, a 9th grade algebra teacher, knows her students must have an understanding of fractions, decimals, percents, and basic mathematical operations to be successful in her class. She pre-assesses her students to see where they are for each standard. The information will help her decide the starting point for instruction. Should she start with new concepts or first work on foundation competencies? Where will she set her baselines for competency? At a certain level of correct answers on a pre-test? And how many students must meet the set baseline target? Figure 3.1 is a table of Ms. Dix's pre-assessment data, showing what percentage of students she considers *proficient*, *partially proficient*, or *not proficient* in each standard.

FIGURE 3.1		Sample Pre-assessment Data		
Pre-assessment results for Ms. Dix's 9th grade algebra students Entry Data: Standards Proficiency				
Proficiency	% Not Proficient	% Partially Proficient	% Proficient	
Standard 1: Basic operations	5	15	80	
Standard 2: Fractions	12	28	60	
Standard 3: Decimals	25	45	30	
Standard 4: Percents	21	49	30	

Ask Yourself: What Do the Students Need to Know and Do at This Point?

This second set of questions focuses on students' immediate needs, both as a group and as individuals:

- What level of understanding, proficiency, or mastery must each student have in order to move forward with the planned instruction?
- How many (and which) students have the requisite skills and entry knowledge to proceed with instruction?

After determining the percentages of students at each proficiency level, Ms. Dix, our algebra teacher, can see which standards need more attention. She can consider what target mastery percentages she would like to reach for each standard and which of her students she thinks have enough learning to move forward. The trigger points for how many need to achieve and at what level will vary by teacher, content area, and district. In some cases, a higher level of achievement in core knowledge and skills is required

in order to move forward with instruction. For example, if a pre-assessment shows that not every student is able to demonstrate adequate knowledge about laboratory safety, then labs will not be part of instruction until they all reach proficiency. Each teacher's instructional design should map out the levels of achievement students are expected to reach and the associated instructional response when students do or do not measure up to these benchmarks.

Ask Yourself: How Do I Use the Data?

The third set of questions focuses on action, decisions, and adjustments:

- How can I decide which data are most educationally significant and defensible?
- What steps can I take to respond to the pre-assessment data?
- How do I adjust my teaching so that all students can be successful?

Ms. Dix uses the pre-assessment data to guide instructional content and rate of delivery as well as to plan selected interventions for her class. Based on her analysis, she decides to do a whole-class review of decimals and percentages, embed more fractions in the curriculum, and give students with less proficiency in basic operations some specialized instruction by grouping them together for a mini-lesson on foundations. As instruction proceeds, she continues using assessment in a formative manner to guide decisions and measure student progress against her pre-assessment data.

It's important that a teacher be open-minded yet opportunistic when looking at the documentation of students' incoming abilities. Flexibility is key in making adjustments to instruction. Remember, because you are using ongoing formative assessment, you will continue to receive more information about how effective your responses are in improving learning and can fine-tune them further by

- Changing a particular lesson plan in the unit
- Selecting different or additional resources
- Using different instructional strategies

- Identifying specific students in need of remediation
- Customizing rubrics to personalize the weight of the mastery of selected standards
- Grouping students homogeneously for differentiation or in heterogeneous groups for collaborative learning
- Changing the planned summative assessments

REFLECT AND APPLY

We will discuss gathering, using, and acting on data in more depth in Chapter 7. For now, choose a pre-assessment strategy and think about a unit of study in your curriculum. What data could you glean from using this pre-assessment strategy? What would your target learning goals be, and what instructional responses might you make?



Case Studies for Analysis

As you read the following case studies, reflect on what you have learned so far to determine whether the teacher's practices represent defensible formative assessment. What is the teacher doing to pre-assess? Are the pre-assessments nonthreatening, engaging, and revealing about prior knowledge, skills, or beliefs? Does the teacher use the data to adjust or differentiate instruction? How many different strategies can you identify?

Consider each of these main points in your analysis and evaluate the case study. Compare your ideas to the analysis given at the end of each study.

Case Study 1

Mrs. Chavez began her English class by asking a series of questions about a short novel that students were reading: "How does the theme of this book compare to that of previous books we've read?" "Which character is most important to the storyline?" "In what ways are the settings in this

novel similar to those of others that we've read?" Her purpose was to identify baseline understanding of themes and characters.

Students recorded their responses on a grid that provided a box for each question and then found a classmate to share ideas with and complete their individual response sheets. During this dyad sharing time, Mrs. Chavez walked around and listened for students' understanding and gaps in knowledge. She asked some probing questions, such as "How would you describe this character's personality?" and "Why do you think the author chose this place and time?"

After a few minutes, she asked all students to take their sheets to an assigned group of three to share and compare responses. During this walk-about, Mrs. Chavez paid particular attention to selected students who had demonstrated gaps in understanding during the first pairing. In the triads, students shared the work from their dyads and then developed one collaborative response to each question. Each group posted its answers on sheets of newsprint tacked to the bulletin board and labeled: "Character," "Theme," and "Setting." After all the students had time to read the other triads' responses, the teacher asked them to look for areas of commonality and to use a SMART Board to compile the responses and develop one collaboratively agreed-upon response to each question. Students made corrections to their individual sheets, and at the end of the lesson, students completed an exit slip explaining what they had learned, relearned, or been reminded of regarding the key literary concepts. Mrs. Chavez collected their individual work for review, planning to identify misunderstandings and determine interventions.

Ask yourself: Did Mrs. Chavez use a formative assessment? If so, what elements made it formative? Would you advise Mrs. Chavez to make any changes in her practice?

Analysis: This scenario has parts of formative assessment in it. Mrs. Chavez connected an initiation activity and lesson preview to students' prior learning, but it's not clear what she did with the information she gathered. During the activity, she circulated and listened attentively and then divided

the students into mixed-ability triads. Students had choice when the stakes were low; when the learning became more consequential, they were put in thoughtfully assigned groups. Mrs. Chavez used collaboration to supplement and reinforce knowledge. At the end of instruction, students presented evidence of whole-class learning, but it wasn't clear which students needed additional review. To complete this lesson in a formative way, Mrs. Chavez would need to collect and analyze individual data, give feedback, and select responsive interventions.

Case Study 2

At the beginning of a statistics class, Mr. Smith asked students to go up to the board and post their answer to a selected homework question. After a quick review of the responses, Mr. Smith pointed out the three problems that had been answered correctly. He then asked one of the students who got it right to share her process with the others. The other students self-corrected their work. Mr. Smith pointed out any particularly troublesome places in the problem, asked if there were any other questions, and then began the next lesson.

Ask yourself: Did Mr. Smith use a formative pre-assessment? What would you recommend that Mr. Smith do differently to get the most out of assessment in his classroom?

Analysis: Although Mr. Smith could determine which students understood the problem and which did not, he didn't offer any interventions. If it was clear that the majority of the class missed an idea, then there needed to be an instructional adjustment. When the data indicate certain students "don't get it," it is important to determine whether each student's incorrect response truly reflects a lack of understanding or is a computational error. None of this was obvious in the scenario. While Mr. Smith did gather data, he made minimal use of it.