START WITH Higher-Order Thinking

These three strategies can help you ensure that every lesson encourages students to think deeply.

Susan M. Brookhart

Memorizing facts is boring. Drill-and-practice is boring. But thinking, for most students most of the time, is actually fun. The good news is that lessons that support higher-order thinking are also likely to interest and engage students.

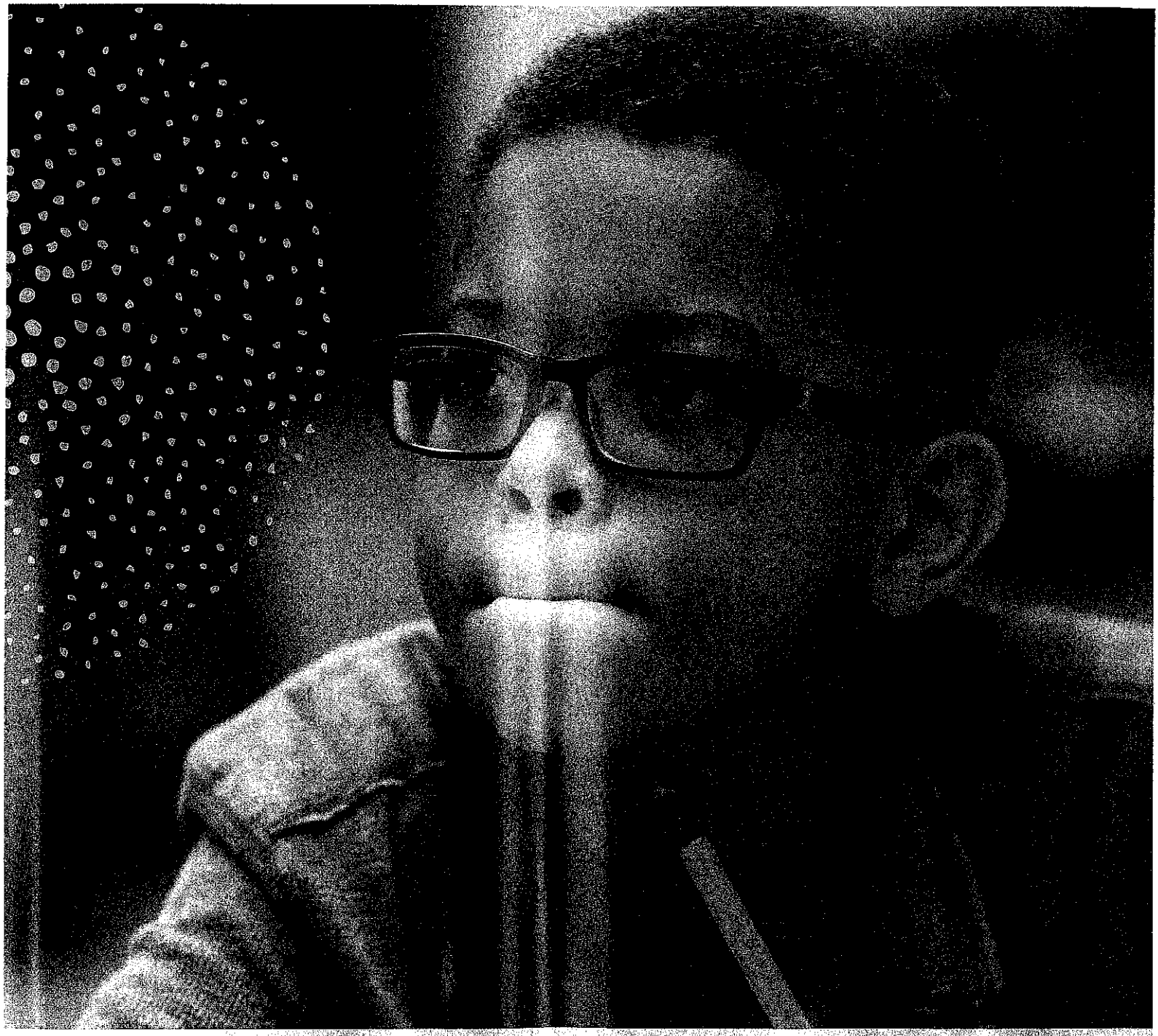
In this article, I share three of the many strategies available for infusing higher-order thinking skills into your lesson plans. Try one or more of these, and experience the magic of students thinking together. With support and scaffolding (students who are used to memorization and drill may need to be convinced you really want them to think), both learning and motivation should improve. And that may inspire you to find other ways to infuse higher-order thinking into your classroom lessons.

Strategy One: Open Questions

I recommend that you plan two or three open questions for every lesson. Craft those questions carefully to make sure they tap the particular content and thinking skills you want to teach. And to deepen the learning even further, be sure to include in your lesson plan some follow-up strategies to get students to respond to one another instead of just to you.

Designing Open Questions

Ask students to describe similarities and differences. Be careful; asking for similarities and differences can be a simple comprehension strategy (for example, "Compare and contrast the physical characteristics of mammals and reptiles"). Instead, you need to go for comparisons that



require analysis and reasoning about concepts or situations. In mathematics, for example, when teaching number sense, you might ask, "How are 11 and 16 alike? How are they different?" Students will come up with all kinds of ideas. Or in social studies, "How was the political climate in President Obama's first term like that in his second? How were the two climates different?" To answer these questions, students must know and comprehend both elements in the comparison, but they also must use reasoning to make and defend the comparisons.

Describe a fictional student. Students sometimes find it easier to critique an idea if the object of their criticism is a fictional student. Write a brief scenario—even just a sentence or two—describing the work or thoughts of a fictional student, and then ask for student responses. There are two ways this can work.

First, students can analyze the thinking of a fictional student who performed a procedure "wrong," describing how they would correct it. For example, you might say, "Conrad solved this problem. Do you agree with Conrad's answer? If not, what would you tell him?"

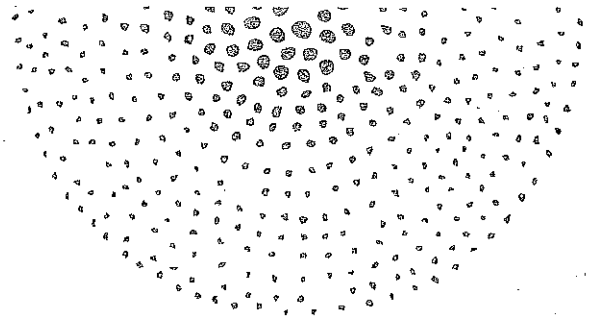
$45 - 3x = 141$

$45 - 141 - 3x = 0$

$96 = 3x$

$x = 32$

This math problem has a correct answer ($x = -32$), so finding the answer to the problem itself is a closed question. But figuring out what Conrad was thinking requires



analysis of his partially incorrect steps, and explaining his errors opens up the question to a variety of student approaches.

A second way to use fictional students is to elicit student thinking about different sides of questions that are already open. For example, if students are studying the local ecosystem and their school is near a river, your open question might have two fictional students disagreeing: "Elijah thinks that the best way to increase the trout population in the river is to pass a law prohibiting manufacturers from dumping waste into the river. Nicholai thinks the best way to help the trout population is to increase the number of flies and other insects in the river, so the trout will have more food. Do you agree with either position? What would you say to Elijah or Nicholai?"

Ask students to make an argument or explain their reasoning. Probably the simplest suggestion for designing open questions is to ask "Why?" as often as you can. Of course, waiting until a student says something interesting and then asking her "Why?" leaves a lot to chance, so when you're preparing a lesson, try to preload some "Why?" questions into your class discussion. For example, in a lesson on interpreting informational text, ask "Why do you think the author describes the life of tigers first in the article, before she talks about how tigers are endangered?" Or for a social studies lesson about World War I and its aftermath, "Why do you think many people in the United States became isolationist in the period right after World War I?"

Encouraging Students to Respond to One Another

Use wait time. Students will need more time to answer higher-order thinking questions than they will to answer questions about facts. If you don't provide enough wait time, you'll get either no responses or surface-level responses. One way to give students wait time is by literally waiting, asking for silence while students have time to get their thoughts together. "Think time, no hands up" is a good general strategy for simple waiting. When all the students have thought about the question and everyone is ready, ask for volunteers. This strategy works at all grade levels, but especially for young children.

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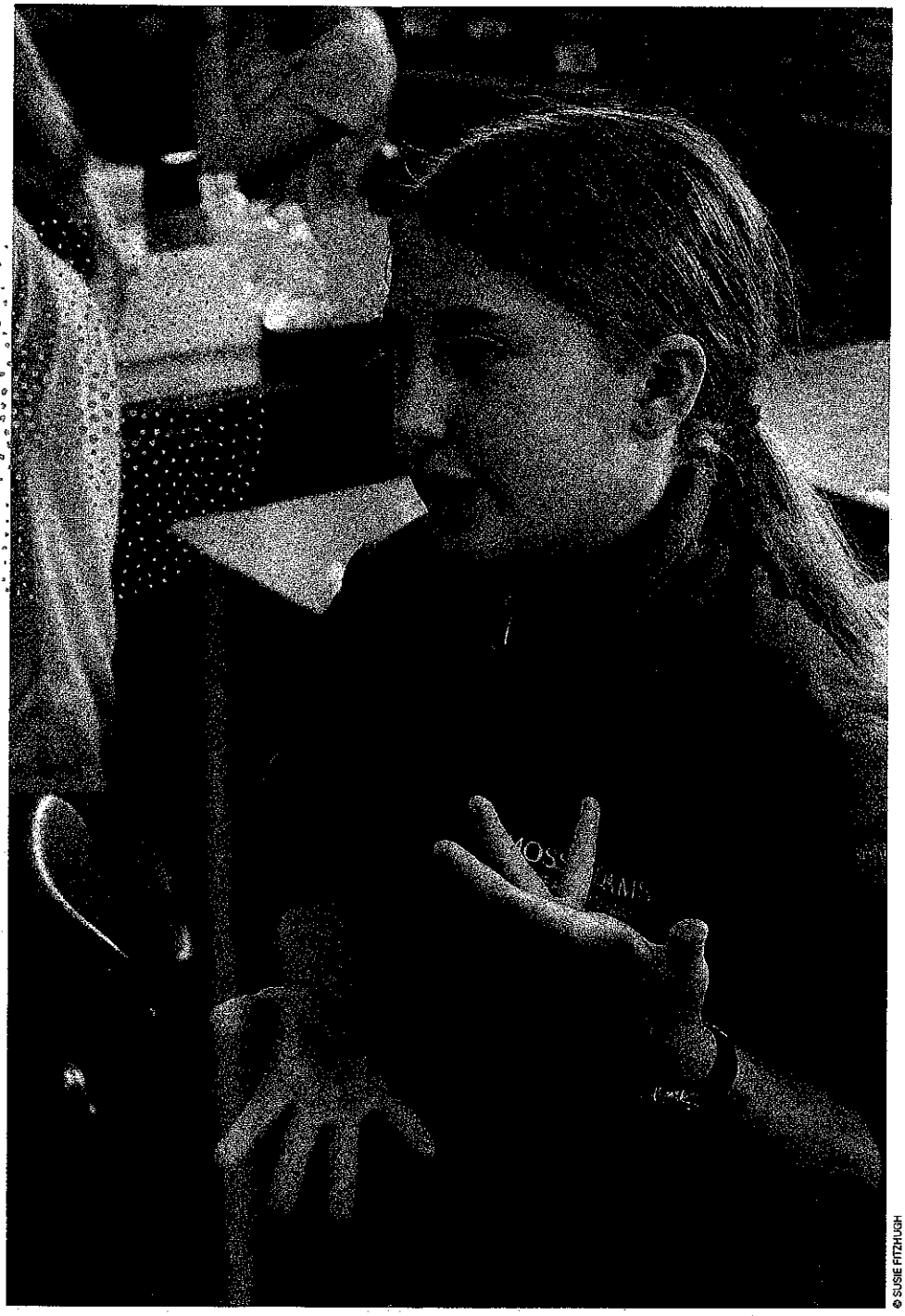
Another way to give students wait time is to structure a way for them to think out loud as they process their thoughts. A classic strategy for achieving this is think-pair-share. There are many variations of this strategy, but the basic idea is that you ask an open question and give students a brief time to think, then time to talk with a partner, and then the opportunity to share with the whole group. By the time students must share their thinking with everyone, every student should have something to say—whether it's something the student was thinking, something his partner was thinking, or something they cooked up together. No one is stranded or disenfranchised, and everyone has had the opportunity to think, not just the few students who are called on.

Ask follow-up questions in whole-class discussions. Typically, students answer closed questions with the expectation that the teacher will tell them whether they're right or wrong. Open questions, however, can support more participation than that. As students offer their thoughts about the open question you've asked, resist the temptation to comment yourself. Instead, ask follow-up questions that allow other students to respond. Here are some examples: "Ella, can you tell us in your own words what Matio's position on genetic engineering is?" "Sonjai, can you add another reason to Sarah's argument that George Washington was uniquely suited to be the first U.S. president?" "Jamal, do you agree with what Julia just said about the speaker in Robert Browning's 'My Last Duchess'? Why or why not?"

Ask follow-up questions in small-group work. You can also start a whole-class discussion, take it in a productive direction for a few minutes, and then send students into small groups to discuss an open follow-up question that furthers students' thinking about the content. For example, after a class discussion about how chemical and physical changes are alike and different, during which you asked students to elaborate on one another's explanations, you might send them into small groups with another open question: "Sometimes chemical and physical changes happen together. For example, cutting the grass is a physical change, but it causes the cut part of the grass to die, which is a chemical change. Can you think of other examples? Which aspect of your example is a chemical change? Which is a physical change? Why?"

Strategy 2: Thinking, Not Retelling

A retelling task asks students merely to look up and reproduce information—artfully perhaps, but without additional cognitive processing. For example, a teacher assigns students



to find out about the natural resources in their state and assemble these facts into a report, poster, or brochure. The assignment requires students to locate information, but not necessarily to understand it or even remember it. There are tons of examples of retelling tasks on the Internet. Many of them look good. For example, in one high school class, each student artistically illustrated one element of the periodic table of elements. But in the end, all they had was a pretty reproduction of the periodic table.

As one step above simple copying information, some retelling tasks ask students to put information in their own words. Such tasks have a place—for example, we can use them to assess comprehension in reading lessons. However, even comprehension-level retelling tasks stop short of asking students to use higher-order thinking.

Here are two of the many ways you can turn retelling tasks into active thinking tasks. Both strategies start with content that might have been the subject of a retelling task, but instead have students ask (and answer!) something meaningful about that content. In the process, of course, students will have to comprehend the content, but they'll also have to wrap their heads around it in a more active way.

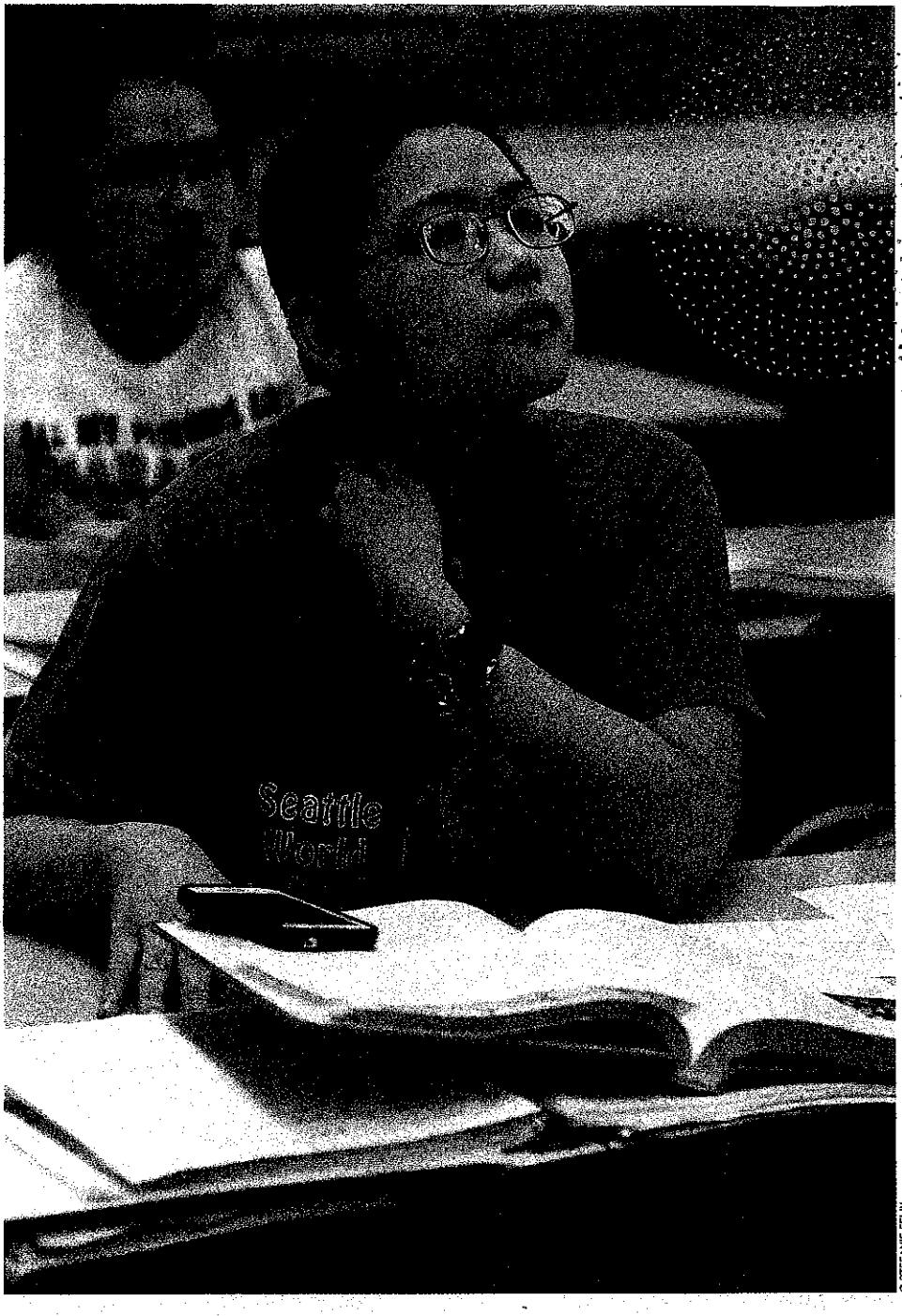
Pose a purposeful problem. Asking students to make a poster is the "poster child" for a retelling task—one that you find in many classrooms and all over the Internet. All students have to do is copy information onto their poster, make it colorful and attractive, and voilà, they have a completed assignment, with no evidence of what they understand about their topic.

Whenever you are tempted to assign a retelling task, start by posing a purposeful problem. Ask yourself, What might be an interesting problem to solve, one where students would have to know something about ___? For example, suppose your students are learning about the planets. Instead of having them choose a planet and make a poster showing its characteristics, give them this task:

> You are one of a new generation of astronauts. You have been asked to help decide what planet you'd like to settle and why. Look at the characteristics of each of the eight planets in the solar system, and decide which one you'd want to try to settle. Make a poster describing your planet, the challenges it would present, and some of the equipment you might need to settle it. (For example, if the planet is very cold, you might need some equipment that would provide heat.)

To accomplish this task, students will have to look up planet characteristics, understand what they mean, and prioritize them in terms of challenges they would be interested in facing. That means they must learn about the planet (your original learning intention) and also think analytically and critically about the information.

Ask "what if" and "what else" to compel students to expand or elaborate on what they're studying, analyzing, or describing. For example, in social studies, if students are studying



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presidential elections, you might be tempted to assign students to write a report on the election of their choice. That's a retelling task. Instead, you could ask "What might have happened in the 1968 presidential election if the United States were not embroiled in the Vietnam War?" Instead of simply learning facts about the 1968 presidential election, students would have to interpret those facts and understand what they mean. (An even more open version of this question would be to let students choose the election year and develop their own what-if scenario.)

Here's an example in science. If students are learning about the water cycle, instead of giving them a retelling task like making a model of the water cycle, ask them "What else would you need to know about a particular region to predict how the water cycle would function there?" In working on their projects, students might think about factors that would influence how the water cycle functions in any given location, such as the climate, the geology of the land, and the presence of bodies of water.

Or in mathematics, if students are learning how to do long division using the standard algorithm, give them a problem (such as 46 ÷ 3), ask them to solve it using the standard algorithm, and then ask, "How else could you solve this problem?" In figuring out other methods (using drawings, counters, or other algorithms, perhaps), students will also be processing what it means to divide.

Strategy 3: Student Self-Assessment

Students who can self-assess are poised to be life-long learners. They are poised to use self-regulation strategies and to be their own best coaches as they learn. They are able to ask focused questions when they don't understand or when they're stuck. Here are three strategies for building student self-assessment into lessons to promote higher-order thinking.

Teach students to self-assess with rubrics. Clear success criteria in the form of checklists or rubrics give students a tool they can use, alone or with partners, to assess the quality of their own work. In general, checklists are better for helping students assess how well they've followed directions, with such criteria as, I put my name on the paper, I wrote an introduction and conclusion, and I used at least three sources. Rubrics are better for self-assessment of qualities that indicate learning. (I stated a position. I defended it with reasoning. I used supporting details to back up my reasoning.) You'll need to teach some students to match qualities in their work with the qualities listed in the rubric.

There are many ways to infuse the

use of self-assessment with rubrics into lessons. Probably the simplest is to stop at some point and have students, alone or in pairs, use the tool to self-assess and record their current status, either on a sticky note or on the rubric itself. This pause will not derail your lesson or take time away from things you need to cover. It's time well spent, and in the long run it will make learning more effective and efficient.

Use of rubrics for self-assessment can be more elaborate. For example, you can hang a poster-sized version of your rubric on the wall and have students place anonymous dots indicating their appraisal of the current status of their work. Individual students will be aware of their own self-assessment, but all you'll see is an aggregated picture of overall class self-assessment. Another variation is to have students self-assess against a rubric and share their thoughts with a partner. Or you can ask students to highlight phrases on the rubric using a different color for each attribute, and then highlight their work accordingly. For example, if the rubric asks students to "take a position," they can highlight that phrase on the rubric in yellow and highlight the place in their essay where they take a position in the same color.

Use confidence ratings. Students can be more confident or less confident in their self-assessments. There are many ways to ask students how sure they are about the quality of their work and their learning. Here are a few.

In open discussion, ask students to indicate how confident they are that they understand a specific term or concept (for example, "I know what an adjective is") by holding up "fist-to-five" (where a fist means zero confidence and five fingers means complete confidence). These votes are best kept private—for instance, by signaling just in front of the chest while facing the teacher—to minimize embarrassment or peer pressure.

During individual seatwork or writing, have students put red, yellow, or green circle stickers on their work. Green means "I am confident I understand this," yellow means "I think I understand but I'm not sure," and red means "I don't really understand this yet." You can use this information to give more nuanced responses in your feedback. For example, low-quality work with a green sticker shows something quite different from high-quality work with a red sticker. In most lessons, however, the more likely distinctions will be between students with medium-quality work who show more and less confidence. Students with medium-quality work who believe they understand may need feedback targeted to specific errors. Students with medium-quality work who believe they don't understand may need feedback about the learning target in general as well as specific assistance.

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Have students co-create success criteria. For learning goals with which students already have some familiarity, student self-assessment can begin with jointly creating the criteria you and the students will look for in their work. This higher-order, creative exercise requires students to look at work samples, decide whether they are of high or low quality, decide what makes them high-quality or low-quality, and describe those characteristics. Give groups of students an unlabeled set of student work (for example, 10 different poems that use imagery). Have them sort the work into piles of high, medium, and low quality, and then ask them to come up with descriptions of what makes these poems high-, medium-, or low-quality work. List all the descriptions from all the groups on a whiteboard or on newsprint. Then ask students to group like descriptions (for example, "vivid" and "dramatic" are getting at the same quality in an image). Organize the resulting list into a rubric that students can use for self-assessment.

A Key Decision for Every Lesson

The most important question you can ask when you plan a lesson is probably this: How will I infuse higher-order thinking into this lesson, making sure that students are required not only to know something, but also to apply what they know? The strategies I've described here have just scratched the surface of the many methods available. Whether you use these strategies or others, I urge you to give students the opportunity to engage in higher-order thinking in every lesson. The result will be students who are more engaged and who learn more deeply. EL

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