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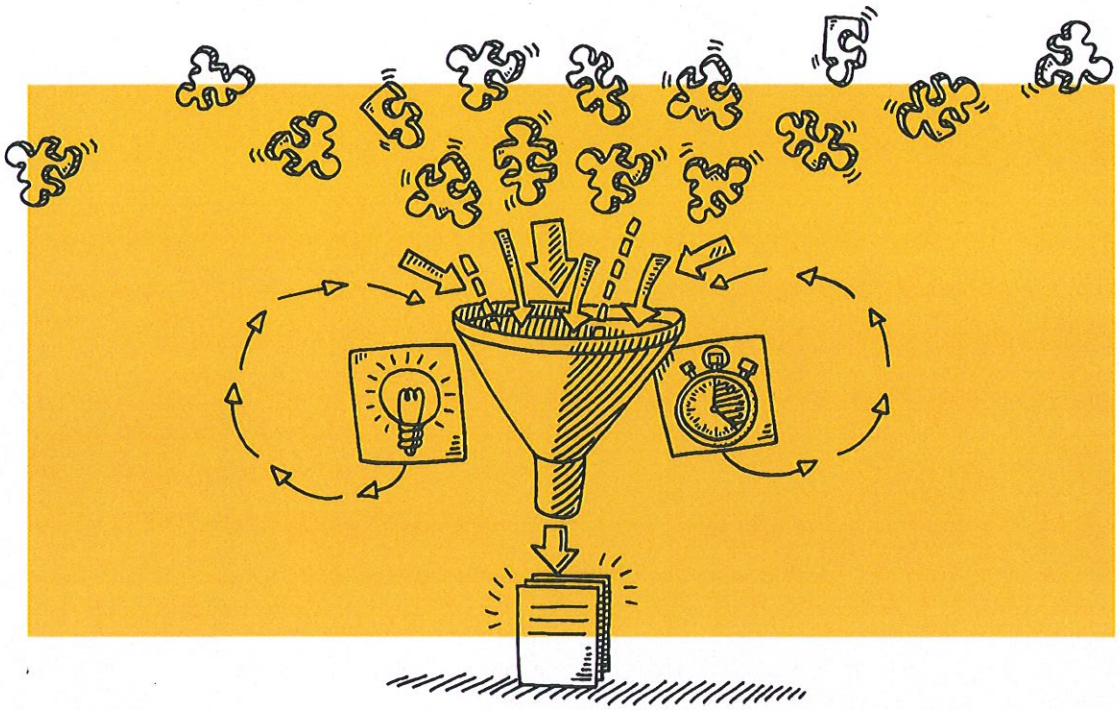

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THE RESEARCH IS IN

5 Indispensable Ways to Deepen Student Comprehension

Simple, in-class activities—drawn from recent research—that you can use to cement hard-won student insights.

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August 5, 2022

For the most part, students aren't good at picking the best learning strategies—in study after study, they opt for the path of least resistance, selecting the strategies that provide an immediate sense of accomplishment.

In a *2018 study* (https://doi.org/10.1177%2F1745691617710510), researchers pinpointed the crux of the problem: "Students want to see rapid gains when they are studying," and they will pick whatever strategy they think will prepare them for tests or exams the quickest, even if it results in surface-level understanding. Speed

is valued over comprehension, the researchers found, and while it may result in short-term gains, they tend to be fleeting.

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Durable learning—the kind that sticks around and can become the foundation of a growing body of internalized knowledge—comes from hard work and even some degree of cognitive resistance. To get there, students need to tear down and rebuild learned material, breaking problems apart, identifying the most salient points, evaluating the relevance of each idea, and then elaborating on or even excavating novel insights from the original material.

We scoured the research to find five relatively simple classroom strategies—selecting paper-and-pencil activities, for example, over activities that might require more setup—that will push students to the next level of comprehension.

STRATEGY 1: THE POWER OF SUMMARY (WITH NO CUTTING-AND-PASTING)

It doesn't sound like much, but summarizing vastly outperforms activities like rereading. In a *2021 study* (https://doi.org/10.1007/s10648-021-09594-w), students first learned about greenhouse gases and then either wrote a short summary of what they had just learned, read a summary provided by the teacher, or simply reviewed each slide with no additional activity. On a follow-up test, the students who summarized scored 34 percent higher than the students who read a summary and a full 86 percent higher than the students who simply reviewed the original slides.

Why is summarizing so beneficial? The researchers explain that it taps into key cognitive processes that encode learning more deeply: Students not only pay more attention to the information but also "mentally organize it into a coherent structure" and then integrate the information into existing knowledge networks, creating more durable memories.

When teaching your students how to summarize, instruct them to avoid verbatim or copy-and-paste approaches. Have students recapitulate a concept with computers and books closed, for instance, and emphasize that doing so will test their actual knowledge more effectively, because "verbatim transcription may actually hinder learning by preventing the learners from engaging with the material more meaningfully," researchers write in a *2018 study* (https://doi.org/10.1177%2F1745691617710510).

STRATEGY 2: YES, SKETCHNOTES WORK

Making visual sense of a challenging concept is often a richer exercise than traditional note-taking—or you can use it as a productive follow-on activity. Recent studies confirm what teachers know: When kids create concept maps, flow charts, or graphic organizers, they visually reorganize and make sense of learned material while highlighting the relationships between key concepts. When such artifacts are hand-drawn, they have the additional benefits conferred by deep, sensorimotor networks.

In a *2017 meta-analysis* (https://doi.org/10.1007/s10648-017-9403-9) encompassing 142 studies and 11,814 students, researchers discovered that learning by creating concept maps—similar to sketchnotes or

flowcharts—was significantly more effective than "learning through discussion or lecture-based treatment conditions" and "moderately more effective than creating or studying outlines or lists." They concluded that concept maps are a way to step back and look for overarching patterns, revealing the "macrostructure of a body of information." Similarly, a *2021 study* (https://psycnet.apa.org/doiLanding?doi=10.1037%2Fedu0000606) found that students who filled in their own graphic organizers improved academic performance by 40 percent on a test of factual recall and 155 percent on a test of deeper comprehension.

Seventh-grade social studies teacher Carla Marschall *uses concept maps* (/article/3-ways-boost-students-conceptual-thinking) to "nudge students beyond the learning of facts and skills to uncover concepts—transferable ideas that transcend time, place, and situation." When teaching her students about the civil rights movement of the 1960s, for example, she helps them make connections between concepts such as "nonviolent protest" and "civil rights," allowing them to "zoom out to see the big picture of their learning."

STRATEGY 3: ASKING GOOD—AND THEN BETTER—QUESTIONS

Getting students to craft high-quality questions of their own might be a better test of student comprehension than any quiz you can devise, a *2020 study* (https://doi.org/10.1002/acp.3639) suggests.

In the study, researchers discovered that students who studied a lesson and then wrote their own questions outperformed students who simply restudied the material by 33 percent. "Question generation promotes a deeper elaboration of the learning content," says Mirjam Ebersbach, a professor of psychology at the University of Kassel. "One has to reflect what one has learned" and then extrapolate "how an appropriate knowledge question can be inferred from this knowledge."

While getting kids to pose simple questions—like yes/no, multiple-choice, or short-answer prompts—can lead to better retention, the deepest learning will require your students to ask tougher questions. *Other studies* (https://doi.org/10.1002/acp.3639) have shown that "students performed better in recall tests when they were trained to generate cognitively challenging questions."

Work with students to identify crucial themes or insights, and model how to write more complex, open-ended questions that start with *explain*, *why*, or *how*. These simple question starters will encourage students to think about the material more deeply, shifting from the details of a lesson to the bigger-picture concepts that help drive deeper learning.

STRATEGY 4: EVEN BAD DRAWING IS PERFECTLY GOOD

In a *2018 study* (https://doi.org/10.1177%2F0963721418755385), researchers asked students to study lists of common words, such as *trumpet* or *sailboat*, and then either write them down or draw them. When asked

to recall those words, students were twice as likely to remember words they had drawn.

Importantly, the quality of the drawing is largely irrelevant, and students of all ages and skill levels will benefit from even rudimentary sketches: "The benefit one can achieve from drawing during encoding applies regardless of one's artistic talent," the researchers asserted.

Why does it work so well? "Drawing improves memory by encouraging a seamless integration of elaborative, motoric, and pictorial components of a memory trace," the researchers write. Unlike more passive forms of learning, like listening to a lecture or reading text, drawing weaves multiple memory strands together: The visual memory of the image, the kinesthetic memory of the hand drawing the image, and the semantic memory of the concept being learned.

For Jill Fletcher, a middle school teacher in Hawaii, student-created drawings aren't just an engaging way for them to learn the material more deeply—they're also useful windows into how well the students understand the material. She uses "*one-pagers* (/article/using-art-assessments)," a single sheet of paper that students can use to draw pictures that relate to the concepts they're learning about. "It's important to emphasize that you're not assessing the one-pager based on appearances—what matters is that they show their understanding," writes Fletcher.

STRATEGY 5: TEACH YOUR CHILDREN WELL

Parents sometimes complain that they don't want their child "wasting time" by passing their own knowledge on to a peer. But a *2014 study* (https://doi.org/10.3758/s13421-014-0416-z) revealed that when elementary students taught math concepts to their peers, they significantly outperformed students who had studied similar materials more conventionally. That's because good teaching requires you to check for gaps in your own understanding, and students who teach, according to researchers, *put more effort into learning the material* (/video/3-ways-maximize-peer-peer-learning), do a better job organizing information, and feel a greater sense of purpose.

There are numerous ways to create peer teaching relationships:

- *Think-pair-share* (/article/9-strategies-getting-more-students-talk): Have students learn about an issue, pair up with another student to discuss it in detail, and then share their thinking with the class.
- *Three before me* (/video/60-second-strategy-ask-3-me): Encourage students to ask three of their classmates for help before asking the teacher.
- *Jigsaw groups* (/article/how-jigsaw-method-revisited): In small groups, students are assigned different sections of a lesson or topic to study—for example, each student is told to learn about a different organelle in a cell. Students then

discuss their area of expertise with other students who were assigned the same organelle before rejoining their original group to convey what they know.

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