

منابع کتاب

خانه‌ای برای یادگیری

Prelude

1. Peter Gray, “The Decline of Play and the Rise of Psychopathology in Children and Adolescents,” *American Journal of Play* 3, no. 4 (2011): 443–444.
2. We assign pseudonyms and use composite figures to protect privacy.
3. Nearly a decade ago, psychologist Angela Duckworth added *grit* to the list of big qualities more important than grades. We welcome that suggestion, even as we admit some reservations about it. See Angela Duckworth, *Grit: The Power of Passion and Perseverance* (New York: Scribner, 2016).
4. The recognition that one must update one’s skills and knowledge continually to remain employable in a fast- changing world is now so widespread that it is easy to forget that it wasn’t always so. A decade ago, Ken served for two years as the provost of a small public university in Washington, DC, a land- grant school and historically black college. In his capacity as chief academic officer, he met frequently with local leaders, and discussions often centered on the kind of education the school should offer. Nearly always, the advice for serving this (largely poor, black) student population was simply to “train them to hold down a good job.” Yet the limited conception of a good job these leaders had in mind did not insist on ongoing growth or change. This is a discussion and debate dating back at least to the early twentieth century, when W. E. B. Du Bois’s advocacy of broad

education that could prepare students for positions of leadership stood in contrast to Booker T. Washington's calls for job training.

5. On the subject of children's education, parents tend to be woefully ill-informed. Too many books talk down to them or ignore them completely. Some well-publicized studies seem designed to stoke irrational fears, while other advice reflects only the writer's personal whims. Parents have largely lacked access to 245 246 what serious research has revealed about human learning. Part of our aim with this book is to remedy that.
6. Ken Bain, *What the Best College Teachers Do* (Cambridge, MA: Harvard University Press, 2004); Ken Bain, *What the Best College Students Do* (Cambridge, MA: Belknap Press of Harvard University Press, 2012); Ken Bain with Marsha Marshall Bain, *Super Courses: The Future of Teaching and Learning* (Princeton, NJ: Princeton University Press, 2021).
7. Baker in his renowned "Integration of Abilities" course outlined four levels at which people pursue personal growth and urged his students to be part of "group four"— those happy few for whom "growth is the discovery of a dynamic power of the mind." Paul Baker, *Integration of Abilities: Exercises for Creative Growth* (San Antonio, TX: Trinity University Press, 1972), 17. Much more will be said about Baker's approach to cultivating creativity later in this book.
8. Founded by renowned inventor Jerome Lemelson and his wife, Dorothy, the Lemelson- MIT Program at the Massachusetts Institute of Technology has, since 1994, worked to equip diverse groups of children with "the knowledge, skills and mindset needed to invent technological solutions to real-world problems." Read about the program at <https://lemelson.mit.edu/forging-pathway-invention-education>.
9. Giyoo Hatano and Kayoko Inagaki, "Two Courses of Expertise," in *Research and Clinical Center for Child Development Annual Report, 1982-1983*, ed. Kazuo Miyaki (Sapporo, Japan: Hokkaido University Faculty of Education, 1984): 27-36.
10. Jonny Beyer et al., "Environmental Effects of the Deepwater Horizon Oil Spill: A Review," *Marine Pollution Bulletin* 110, no. 1 (2016): 28-51; Mace G. Bar-ron, "Ecological Impacts of the Deepwater Horizon Oil Spill: Implications for Immunotoxicity," *Toxicologic Pathology* 40, no. 2 (2012): 315-320; Thomas G. Safford,

Jessica D. Ulrich, and Lawrence C. Hamilton, "Public Perceptions of the Response to the Deepwater Horizon Oil Spill: Personal Experiences, Information Sources, and Social Context," *Journal of Environmental Management* 113 (2012): 31–39.

11. George Sylvester Viereck, "What Life Means to Einstein," *Saturday Evening Post*, October 26, 1929, 117.
12. Children are naturally curious creatures and usually enter their first classrooms excited about learning, but they often lose that self- drive within a few short years. Even in highly regarded schools, that childhood spark can become a rapidly dying ember.
13. Let's move away from the old notion that some kids are smart and some are not. Research has demonstrated that addressing this single objective— helping a child learn to rebound and grow from failure— will change school and life for your son or daughter more positively than any other single step you might take.
14. This can be tricky. You will want to avoid helicopter parenting that hovers over children constantly, smothering them, but you also don't want to abandon them and their learning.
15. In an era of rapid change how can you help your children learn to live creative and inventive lives? To flourish they cannot just memorize solutions to problems that may not be so important anymore or prepare for jobs that will soon disappear. How can they learn to imagine new worlds and invent fresh approaches? Parents, regardless of their own educational backgrounds, can help foster the creative and imaginative life.
16. Some children don't learn well or deeply because they don't know how, or even understand what it means to do so. We can help you change that. Back in the day, even the student stars used methods of learning that did not always work well, leaving holes in retention and deep understanding. A century of research has challenged those old methods and taught us a new way of thinking. Perhaps most important: How can our kids learn to think, to make wise decisions, to use the ideas and information they will encounter?
17. What should they study? Should your kids strive for a broad education or simply prepare themselves for a particular job, or line of work? Can they or should they simply follow the money and prepare for a career where the pay is highest?

Our society seems caught between these alternatives, unable to decide. Pressure grows every year to do the latter, especially for families with little money. Is that the best choice, or even a realistic one?

18. Steven Johnson, "The Man Who Broke the World," *New York Times Magazine*, March 19, 2023, 38.
19. For more on Thomas Midgley and the dangers of lead exposure, see Herbert L. Needleman, "The Removal of Lead from Gasoline: Historical and Personal Reflections," *Environmental Research* 84, no. 1 (September 1, 2000): 20–35; Kat Eschner, "Leaded Gas Was a Known Poison the Day It Was Invented," *Smithsonian Magazine*, December 9, 2016; Kat Eschner, "One Man Invented Two of the Deadliest Substances of the 20th Century," *Smithsonian Magazine*, May 18, 2017; David C. Bellinger, Karen M. Stiles, and Herbert L. Needleman, "Low- Level Lead Exposure, Intelligence and Academic Achievement: A Long- Term Follow-up Study," *Pediatrics* 90, no. 6 (December 1, 1992): 855–861; Bruce P. Lanphear et al., "Low- Level Environmental Lead Exposure and Children's Intellectual Function: An International Pooled Analysis," *Environmental Health Perspectives* 113, no. 7 (July 2005): 894–899; Howard W. Mielke and Sammy Zahran, "The Urban Rise and Fall of Air Lead (Pb) and the Latent Surge and Retreat of Societal Violence," *Environment International* 43 (August 1, 2012): 48–55; J. R. McNeill, *Something New Under the Sun: An Environmental History of the Twentieth-Century World* (New York: Norton, 2000), 111–114; Steven Johnson, "The Brilliant Inventor Who Made Two of History's Biggest Mistakes," *New York Times Magazine*, March 15, 2023.
20. Adam Grant, *Think Again: The Power of Knowing What You Don't Know* (New York: Penguin, 2021), 25.

One: Sparking Curiosity

1. Scott Hershovitz, "How to Do Philosophy with Kids," *Psyche*, December 21, 2022, <https://psyche.co/guides/how-to-talk-about-philosophy-with-kids-so-you-think-together>.
2. Michelle M. Chouinard, "Children's Questions: A Mechanism for Cognitive Development," *Monographs of the Society for Research in Child Development* 72, no. 1 (2007): i–129.

3. Richard M. Ryan and Edward L. Deci, "Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions," *Contemporary Educational Psychology* 25, no. 1 (2000): 54–67.
4. Ken Bain, *What the Best College Teachers Do* (Cambridge, MA: Harvard University Press, 2004): 32–36.
5. Richard M. Ryan and Edward L. Deci, "Self- Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well- Being," *American Psychologist* 55, no. 3 (2000): 68–78.
6. Wealthy families have long had the advantage of early tutors and schooling. In the 1960s, the Johnson administration created Head Start for poor families and the Carter administration expanded it in the late 1970s.
7. For other suggestions of thought- provoking movies, see Julian Baggini et al., "I Watch Therefore I Am: Seven Movies that Teach Us Key Philosophy Lessons," *The Guardian*, April 14, 2015. Choose according to your child's age and select others as they grow older.
8. For Charles Darwin's notebooks, see "Darwin's Notebooks and Reading Lists," Darwin Online, https://darwin-online.org.uk/EditorialIntroductions/vanWyhe_notebooks.html; for Marie Curie's, see Marie Curie, "Notebook," Wellcome Collection, <https://wellcomecollection.org/works/cywqefw4/items?canvas=9>.
9. "Philosophy and Children's Literature," PLATO— Philosophy Learning and Teaching Organization, <https://www.plato-philosophy.org/childrens-literature/>.
10. See Bob Hirshon, "These DIY Science Projects Let You Help Real- World Research," *Discover*, updated July 9, 2020, <https://www.discovermagazine.com/the-sciences/these-diy-science-projects-let-you-help-real-world-research>.
11. Quoted in Donald Sheff, "Izzy, Did You Ask a Good Question Today?" letter to the editor, *New York Times*, January 19, 1988, A26.
12. Dan Rothstein and Luz Santana, *Make Just One Change: Teach Students to Ask Their Own Questions* (Cambridge, MA: Harvard Education Press, 2011).
13. Rothstein and Santana, *Make Just One Change*, 27.

14. Thanks to Belmont University math professor Mike Pinter for both of these suggestions.
15. “Compare the States,” *Chronicle of Higher Education*, August 2, 2024, <https://www.chronicle.com/article/almanac-states>.
16. For analysis of the spring 2020 and fall 2020 semesters, see Wan- Lae Cheng, Jonathan Law, and Duwain Pinder, “COVID-19 Crisis Pushes US Students into an Uncertain Job Market,” *McKinsey & Company*, July 7, 2021, <https://www.mckinsey.com/featured-insights/sustainable-inclusive-growth/future-of-america/covid-19-crisis-pushes-us-students-into-an-uncertain-job-market>.
17. Molly Woodworth, quoted in Emily Hanford, “At a Loss for Words: How a Flawed Idea Is Teaching Millions of Kids to Be Poor Readers,” *APM Reports*, April 22, 2019.
18. Hanford, “At a Loss for Words.”
19. “NAEP Report Card: Reading,” The Nation’s Report Card, accessed April 5, 2024, <https://www.nationsreportcard.gov/reading/nation/achievement/?grade=4>.
20. Emily Hanford, *Sold a Story*, podcast, <https://features.apmreports.org/sold-a-story/>.
21. “Word of the Day App,” accessed April 5, 2024, <https://wordwordapp.com/>.
22. The Starfall Learn to Read app is free to download wherever apps are available. Starfall also offers educational material on reading and the alphabet at www.starfall.com. It used to be entirely free but now some of it is behind a paywall. The free part is still valuable. For other resources, see Bonnie Terry, “Best Practices for Teaching Phonics,” *Scholar Within*, February 23, 2022, <https://scholarwithin.com/best-practices-for-teaching-phonics>; Louisa Smith, “10 of the Best Phonics Books to Help Your Child Read,” *A Dime Saved*, September 4, 2023, <https://adimesaved.com/best-phonics-books>.

Two: Helping your kids deal with failure (and success)

1. Herschbach quoted in Ken Bain, *What the Best College Students Do* (Cambridge, MA: Belknap Press of Harvard University Press, 2012), 57.

2. See Ken Bain with Marsha Marshall Bain, *Super Courses: The Future of Teaching and Learning* (Princeton, NJ: Princeton University Press, 2021), 25–26.
3. J. M. Barrie, *Peter Pan in Kensington Gardens* (New York: Charles Scribner's, 1916), 27.
4. Albert Bandura, “Self- Efficacy: Toward a Unifying Theory of Behavioral Change,” *Psychological Review* 84, no. 2 (1977): 191–215.
5. See Carol S. Dweck, *Mindset: The New Psychology of Success* (New York: Ballantine, 2006). Some readers will already have a deep understanding of this territory, others will merely think they do, and still others will encounter these ideas for the first time. Our hope with this brief summary is that many will find in it at least some element they have not explored. Certainly, your children stand to benefit enormously from Dweck's ideas and research.
6. Carol I. Diener and Carol S. Dweck, “An Analysis of Learned Helplessness: Continuous Changes in Performance, Strategy, and Achievement Cognitions Following Failure,” *Journal of Personality and Social Psychology* 36, no. 5 (1978): 451–462. We first discussed this experiment in an earlier work and, at the risk of offending the gods who protect high standards in academia, we have leaned on that account to construct this one. For that earlier and longer version, see Ken Bain, *What the Best College Students Do* (Cambridge, MA: Belknap Press of Harvard University Press, 2012), 104–111.
7. Melissa L. Kamins and Carol S. Dweck, “Person Versus Process Praise and Criticism: Implications for Contingent Self- Worth and Coping,” *Developmental Psychology* 35, no. 3 (1999): 835–847.
8. Jamie Amemiya and Ming-Te Wang, “Why Effort Praise Can Backfire in Adolescence,” *Child Development Perspectives* 12, no. 3 (September 2018): 199–203. What the authors call “effort praise” we here also call “task praise.”
9. Geoffrey L. Cohen, Claude M. Steele, and Lee D. Ross, “The Mentor's Dilemma: Providing Critical Feedback across the Racial Divide,” *Personality and Social Psychology Bulletin* 25, no. 10 (1999): 1302–1318.
10. Claude M. Steele, “Thin Ice: Stereotype Threat and Black College Students,” *The Atlantic*, August 1999: 44–54. Among those who responded so affirmatively to

that third approach were African American students who had suffered through tons of stereotype threats,

11. Another reason some people can't replicate these findings or the studies of fixed and growth mindsets is that they use grades as a measure of change. But grades are notoriously inexact. Later we will relate the memory of a history professor who awarded high grades in a Greek history course only to those who could name the parts of the Parthenon's frieze—the marble sculptures, that is, ringing the big temple sitting on a hill in Athens. It did not matter whether someone understood the major changes that emerged in old Greek culture and society. Nor did it matter whether anything students committed to memory had any influence on how they subsequently thought about that history.
12. Kyla Haimovitz and Carol S. Dweck, "Parents' Views of Failure Predict Children's Fixed and Growth Intelligence Mind- Sets," *Psychological Science* 27, no. 6 (2016): 859–869.
13. These examples are drawn from Haimovitz and Dweck, "Parents' Views of Failure," 866.
14. Elizabeth A. Canning, Katherine Muenks, Dorainne J. Green, and Mary C. Murphy, "STEM Faculty Who Believe Ability Is Fixed Have Larger Racial Achievement Gaps and Inspire Less Student Motivation in Their Classes," *Science Advances* 5, no. 2 (February 15, 2019): eaau4734.
15. For a famous example of college students taking a similar approach to calculus, see Uri Treisman, "Studying Students Studying Calculus: A Look at the Lives of Minority Mathematics Students in College," *College Mathematics Journal* 23, no. 5 (November 1, 1992): 362–372.
16. "Our Story: The Story behind WeWantToKnow and the Development of Drag-onBox Games," <https://dragonbox.com/about/story-story>.
17. David S. Yeager and Carol S. Dweck, "What Can Be Learned from Growth Mindset Controversies?" *American Psychologist* 75, no. 9 (2020): 1269–1284, 1282.
18. Lisa Blackwell, "You Can Grow Your Intelligence: New Research Shows the Brain Can Be Developed Like a Muscle," Brainology Curriculum Guide for Teachers, www.brainology.us/websitemedia/youcangrowyourintelligence.pdf.

19. Joenna Driemeyer, Janina Boyker, Christian Graser, Christian Büchel, and Arne May, "Changes in Gray Matter Induced by Learning—Revisited," *PLoS ONE* 3, no. 7 (2008): e2669.
20. Susan Bobbitt Nolen, "Reasons for Studying: Motivational Orientation and Study Strategies," *Cognition and Instruction* 5, no. 4 (1988): 269–287.
21. Lisa S. Blackwell, Ka li H. Trzesniewski, and Carol Sorich Dweck, "Implicit Theories of Intelligence Predict Achievement across an Adolescent Transition: A Longitudinal Study and an Intervention," *Child Development* 78, no. 1 (January–February 2007): 246–263.

Three: Creating a home that supports learning

1. If you feel unsure about how to help your kids get evidence- based help with school in general or with par tic u lar subjects, the internet can help. Here's one example of the growing number of resources available: "How to Find Free Tutoring and Homework Help Near You," National School Choice Week, updated March 26, 2024, <https://schoolchoiceweek.com/free-tutoring/>.
2. For a good example, on the topic of growth mindset and pitched at a seventh-grade reading level, see "You Can Grow Your Intelligence: New Research Shows the Brain Can Be Developed Like a Muscle," Brainology Curriculum Guide for Teachers, <https://www.mindsetworks.com/websitemedia/youcangrowyourintelligence.pdf>.
3. Specifically on the learning of phonics, here are some resources for use at home: "How to Practice Phonics with Kids at Home," Scholastic, August 7, 2023, <https://www.scholastic.com/parents/books-and-reading/reading-resources/developing-reading-skills/teach-phonics-home.html>; "Early Learning at Home Reading Tips," Teach Your Child to Read, <https://teachyourchildtoread.com/early-learning-at-home/>.
4. Steve Rees, interviews with authors, 2023.
5. More will be said about Paul Baker later in this book. For a compendium of materials he used in classes, see Paul Baker, *Integration of Abilities: Exercises for Creative Growth* (San Antonio, TX: Trinity University Press, 1972).

6. You can read more about Herschbach's boyhood adventures in Ken Bain, *What the Best College Students Do* (Cambridge, MA: Belknap Press of Harvard University Press, 2012), 215–220.
7. For more of the Jeffrey Hawkins story, see Bain, *What the Best College Students Do*, 32–34, 121–125.
8. *James M. Lang*, *Distracted: Why Students Can't Focus and What You Can Do about It* (New York: Basic Books, 2020).
9. Ken Bain with Marsha Marshall Bain, *Super Courses: The Future of Teaching and Learning* (Princeton, NJ: Princeton University Press, 2022), 16.
10. *Candice Millard*, *Destiny of the Republic: A Tale of Madness, Medicine, and the Murder of a President* (New York: Doubleday, 2011).
11. *Bain*, *What the Best College Students Do*, 133.
12. For a documentary about Lipman's work that helped bring the Philosophy for Children program to Great Britain, see Matthew Lipman, *Philosophy for Children*, BBC, 1990, <https://www.youtube.com/watch?v=fp5lB3YVnIE>.
13. See Renia Gasparatou and Maria Kampeza, "Introducing P4C in Kindergarten in Greece," *Analytic Teaching and Philosophical Praxis* 33, no. 1 (2012): 72–82.
14. The stories that the teacher read can all be found in your local public library: Kathryn Cave, *Something Else* (London: Puffin Books, 1994); David McKee, *Elmer* (London: Andersen Press, 2007); and Steve Smallman, *The Lamb Who Came for Dinner* (Wilton, CT: Tiger Tales, 2007).
15. Gasparatou and Kampeza, "Introducing P4C," 75.
16. Gasparatou and Kampeza, "Introducing P4C," 76.
17. "Resources for Parents, Grandparents, and Family Members," PLATO, <https://www.plato-philosophy.org/for-parents-and-grandparents/>.
18. The account of Sandel's course in this section draws on Ken Bain, *What the Best College Teachers Do* (Cambridge, MA: Harvard University Press, 2004), 109–111.
19. *Quoted in Bain*, *What the Best College Teachers Do*, 109.
20. *Bain*, *What the Best College Teachers Do*, 109.

21. See Ken Bain, “What Makes Great Teachers Great?” *Chronicle of Higher Education*, April 9, 2004.
22. Michael Sandel, “Justice: What’s the Right Thing to Do?” Harvard University’s Justice with Michael Sandel, <http://justiceharvard.org/justicecourse/>. Your college- bound children can take the course online for free, if they do not wish to receive certification, or they can pay to receive a certificate and have un-limited access to the material. See “HarvardX: Justice” EdX, accessed April 9, 2024, <https://www.edx.org/learn/justice/harvard-university-justice?in>.
23. *Quoted in Bain*, What the Best College Teachers Do, 110.
24. Sandel, “Justice: What’s the Right Thing to Do? Episode 01 ‘The Moral Side of Murder,’ ” YouTube, <https://www.youtube.com/watch?v=kBdfcR-8hEY&t=11s>.

Four: Fostering a creative mindset

1. The account that follows is drawn from Ken Bain, *What the Best College Students Do* (Cambridge, MA: Belknap Press of Harvard University Press, 2012), 191–198.
2. This is the fourth book in which Ken has discussed Baker’s ideas and work, in part because each time he revisits Baker’s teachings, he discovers something new and important that he had not fully noticed and understood in the earlier telling.
3. For an introduction to Baker’s thought, see Paul Baker, *Integration of Abilities: Exercises for Creative Growth* (San Antonio, TX: Trinity University Press, 1972).
4. Sir Ken Robinson, “Do Schools Kill Creativity?” TED Talk, February 2006, https://www.ted.com/talks/sir_ken_robinson_do_schools_kill_creativity.
5. The quotation from Laughton appears on the inside flap of Robert Flynn and Eugene McKinney, eds., *Paul Baker and the Integration of Abilities* (Fort Worth, TX: TCU Press, 2003), but it was first shared with us by Robyn Flatt, Baker’s daughter, who heard Laughton say it in an oral interview with the press during the English actor’s work with Baker at the Baylor Theater in the 1950s.
6. The quote is from notes Ken took from Baker’s course in 1962, first published in Bain, *What the Best College Students Do*, 3.

7. Baker, Integration of Abilities, 61, *quoted in Bain, What the Best College Students Do*, 14.
8. Albert Einstein, “What Life Means to Einstein,” interview by George Sylvester Viereck, *Saturday Evening Post*, October 26, 1929.
9. Sherry Kafka, quoted in Bain, *What the Best College Students Do*, 16.
10. Author’s notes from Baker’s course, quoted in Bain, *What the Best College Students Do*, 16.
11. Author’s notes from Baker’s course.
12. Bain, *What the Best College Students Do*, 16.
13. Baker often spoke of the need to overcome our “resistance to work.”
14. We originally suggested some of these activities in Ken Bain with Marsha Marshall Bain, *Super Courses: The Future of Teaching and Learning* (Princeton, NJ: Princeton University Press, 2021), 134–135.
15. 15. The teacher is Kate Walker, of the Booker T. Washington High School for the Performing and Visual Arts. In addition to teaching dance, Walker teaches a version of Baker’s Integration of Abilities course. See Bain, *Super Courses*, 133.
16. Elizabeth Emery, “Have Students Interview Someone They Disagree With,” *Heterodox Academy*, February 11, 2020, <https://heterodoxacademy.org/blog/viewpoint-diversity-students-interview-someone/>.
17. See Wendy A. Suzuki, “Editorial: Exercise to Enhance Mental Health,” *Frontiers in Human Neuroscience* 16 (November 24, 2022); Yuen Shan Christine Lee, Teresa Ashman, Andrea Shang, and Wendy Suzuki, “Effects of Exercise and Self-Affirmation Intervention after Traumatic Brain Injury,” *NeuroRehabilitation* 35, no. 1 (January 1, 2014): 57–65; Julia C. Basso and Wendy A. Suzuki, “The Effects of Acute Exercise on Mood, Cognition, Neurophysiology, and Neuro-chemical Pathways: A Review,” *Brain Plasticity* 2, no. 2 (January 1, 2017): 127–152.
18. Talia is a pseudonym. Some minor details of her story have been changed to protect her privacy and to make our central point clearer.
19. Karl Duncker, “On Problem- Solving,” *Psychological Monographs* 58, no. 5 (1945).

20. Katherine W. Phillips, Gregory B. Northcraft, and Margaret A. Neale, “Surface-Level Diversity and Decision-Making in Groups: When Does Deep-Level Similarity Help?” *Group Processes and Intergroup Relations* 9, no. 4 (2006): 467–482. See also Shane Frederick, “Cognitive Reflection and Decision Making,” *Journal of Economic Perspectives* 19, no. 4 (2005): 25–42; and Katherine W. Phillips, “How Diversity Makes Us Smarter,” *Scientific American* 311, no. 4 (2014): 43–47.

Five: Helping your kids learn deeply

1. Names in this story have been changed to protect individual privacy.
2. Ference Marton and Roger Säljö, “On Qualitative Differences in Learning: I—Outcome and Process,” *British Journal of Educational Psychology* 46, no. 1 (February 1976): 4–11.
3. Noel Entwistle, “Motivational Factors in Students’ Approaches to Learning,” in *Learning Strategies and Learning Styles*, ed. Ronald R. Schmeck (Boston: Springer, 1988), 21–51; D. I. Newble and N. J. Entwistle, “Learning Styles and Approaches: Implications for Medical Education,” *Medical Education* 20, no. 3 (1986): 162–175; Noel Entwistle and Bela Kozeki, “Dimensions of Motivation and Approaches to Learning in British and Hungarian Secondary Schools,” *International Journal of Educational Research* 12, no. 3 (1988): 243–255.
4. The TeamLEAD curriculum, developed by Duke- NUS Graduate Medical School Singapore, offers a fantastic example of what deep- learning approaches can accomplish in medical education. See “TeamLEAD at Duke- NUS,” video, 9:03, November 28, 2011, <https://www.youtube.com/watch?v=BlVPLYGd-BLg>. For earlier work on these issues, see Newble and Entwistle, “Learning Styles and Approaches.”
5. For more on surface vs. deep learning, see Ken Bain, *What the Best College Students Do* (Cambridge, MA: Belknap Press of Harvard University Press, 2011), 37–46.
6. Newble and Entwistle, “Learning Styles and Approaches”; John B. Biggs, “Assessing Student Approaches to Learning,” *Australian Psychologist* 23, no. 2 (1988): 197–206.

7. See Karen Arnold, *Lives of Promise: What Becomes of High School Valedictorians* (San Francisco: Jossey- Bass, 1995); D. W. MacKinnon, “The Nature and Nurture of Creative Talent,” *American Psychologist* 17, no. 7 (1962): 484–495; Kay Cheng Soh, “Grade Point Average: What’s Wrong and What’s the Alternative?” *Journal of Higher Education Policy and Management* 33, no. 1 (December 31, 2010): 27–36; Leonard L. Baird, “Do Grades and Tests Predict Adult Accomplishment?” *Research in Higher Education* 23, no. 1 (March 1, 1985): 3–85; Adam Grant, “What Straight- A Students Get Wrong,” *New York Times*, December 8, 2018; Louis Deslauriers et al., “Measuring Actual Learning versus Feeling of Learning in Response to Being Actively Engaged in the Classroom,” *Proceedings of the National Academy of Sciences* 116, no. 39 (September 24, 2019): 19251–19257.
8. Jonathan Malesic, “The Key to Success In College Is So Simple, It’s Almost Never Mentioned,” *New York Times*, January 3, 2023.
9. The questions below have been adapted from Arnold B. Arons, *Teaching Introductory Physics* (New York: Wiley, 1997), 376–382.
10. You can get a good book on logic for children and read it together, doing exercises and puzzles around the breakfast table. You can find a multitude of such resources online and in good bookstores. Let your children pick out one that will tickle their fancy. Books will vary in their content, colors, and puzzles depending on age. That’s one reason you and your kids pick out the best choice for your child at a given age. For children in late high school or early college, try Irving Copi, Carl Cohen, and Victor Rodych, *Introduction to Logic*, 15th ed. (New York: Routledge, 2019). It’s the gold standard of logic texts for young adults, but don’t buy it. It will cost you an arm and a leg. See if your local library has it instead. If not, go with whatever strikes your fancy from a local bookstore that doesn’t cost an illogical amount of money. Get something with games and puzzles that will introduce both formal and informal logic. Steve Pearlman’s Critical Thinking Institute also offers a range of programs for kids of all ages to enhance their critical thinking. “Empowering the Next Generation of Critical Thinkers,” Critical Thinking Institute, <https://www.thecitinstiute.com/brighter-minds-better-futures-main>.
11. See John B. Biggs and Kevin Collis, “Towards a Model of School- Based Curriculum Development and Assessment Using the SOLO Taxonomy,” *Australian Journal of Education* 33, no. 2 (1989): 151–163.

12. The cow examples all come from an accessible introduction to Biggs's thought produced by Aarhus University: Claus Brabrand, "Teaching Teaching & Understanding Understanding," video, 19:00, 2006, <https://www.youtube.com/watch?v=iMZA80XpP6Y>.
13. See John Biggs, "The Role of Metacognition in Enhancing Learning," *Australian Journal of Education* 32, no. 2 (August 1, 1988): 127–138, especially 134–136 for how to improve deep learning.
14. One experiment found that students who reread a passage four times performed worse on a subsequent test than those who read the passage just once and then took notes on what they could recall about the passage without looking at the text again. Henry L. Roediger III and Jeffrey D. Karpicke, "Test- Enhanced Learning: Taking Memory Tests Improves Long- Term Retention," *Psychological Science* 17, no. 3 (March 2006): 249–255.
15. See Peter C. Brown, Henry L. Roediger III, and Mark A. McDaniel, *Make It Stick: The Science of Successful Learning* (Cambridge, MA: Belknap Press of Harvard University Press, 2014), 31–32.
16. For an alternative (and deep) approach to learning physics (or anything else), see what Harvard professor Eric Mazur has done to create a whole new approach to schooling. Ken Bain with Marsha Marshall Bain *Super Courses: The Future of Teaching and Learning* (Princeton, NJ: Princeton University Press, 2021), 86–104.
17. The term "spaced repetition" comes from Brown, Roediger, and McDaniel, *Make It Stick*, x.
18. Brown, Roediger, and McDaniel, *Make It Stick*, 201–202.
19. For an overview of the science behind retrieval practice, see Brown, Roediger, and McDaniel, *Make It Stick*, chap. 2.
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The Learning Household

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