Teacher Edition

# The Science of Learning for Teachers

## Volume 1: Foundations of Learning

*Practical Tools for the Classroom*

Marko Koskinen

scienceoflearning.academy

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## Volume 1: Foundations of Learning

Practical Tools for the Classroom



### About the Publisher

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# Foreword

## Why the Science of Learning Matters

Most teachers have experienced a quiet frustration that is hard to put into words.

You plan a lesson carefully. You explain clearly. Students seem attentive, they nod, they complete the task, and the classroom feels productive. And yet—days or weeks later—much of what was "learned" has vanished. The lesson that felt successful left only a faint trace.

This is not a failure of teachers, effort, or care. It is a mismatch between how teaching is traditionally done and how learning actually works.

For decades, education has relied heavily on intuition, tradition, and personal experience. While these are valuable, they are also unreliable guides to learning. Human memory is deceptive. Performance during a lesson often gives the illusion of learning, even when long-term understanding is weak. Methods that feel effective can, paradoxically, be the least effective.

The **Science of Learning** exists to close this gap.

This book is based on the first *Science of Learning* webinar by the Science of Learning Academy. It is part of a comprehensive webinar series covering several aspects of Learning Science. It lays the foundation for everything that follows. Its purpose is not to offer quick tricks or fashionable methods, but to build a shared understanding of the cognitive principles that govern learning—principles discovered through decades of research in cognitive psychology, neuroscience, and educational sciences.

You do not need to become a researcher to benefit from this knowledge. But you *do* need to ask few important questions:

- what learning really is (and what it is not),
- how memory works,
- why forgetting happens,
- and why some teaching practices reliably outperform others.

Perhaps most importantly, this book aims to relieve teachers of unnecessary guilt. If students forget, it does not mean you failed. It often means the method was working *against* the brain rather than with it.

The Science of Learning does not reduce teaching to mechanics. On the contrary, it protects what matters most: meaningful understanding, long-term growth, and the professional judgment of educators—now supported by evidence instead of guesswork.

If this book succeeds, you will not leave with a list of rigid rules. You will leave with even better questions:

- *What kind of learning does this activity actually produce?*
- *What will students still know in a month?*
- *What does the brain need here?*

Those questions are the starting point of better teaching—and better learning.

Welcome to the Science of Learning.

# Why This Book Exists

This book is part of the work by the *Science of Learning Academy* to help schools to improve the quality and effectiveness of their work. The academy was started by the *Association for Educational Progress*, a non-profit organization founded in 2001 in Finland.

## *Education is full of effort*

Teachers plan carefully. Students try hard. Schools invest time, resources, and care. Yet despite this effort, learning outcomes often fall short of what everyone hopes for. Students forget important concepts. Understanding remains fragile. Teaching feels like constant motion without always producing lasting change.

This book exists because effort alone is not enough.

What matters is aligning effort with how learning actually works.

## *Bridging the Gap Between Research and Practice*

Over the past decades, research in cognitive psychology and educational science has revealed a great deal about how people learn. We understand more clearly how memory forms, how knowledge is retained, why forgetting happens, and which learning strategies are most effective.

Yet much of this knowledge remains outside everyday classroom practice.

Teachers are rarely given clear, practical explanations of these findings. Research can feel abstract, fragmented, or disconnected from the realities of teaching. As a result, many educators continue to rely primarily on intuition, tradition, or personal experience.

This book aims to bridge that gap.

## *Creating a Shared Understanding*

Improving education requires more than individual effort—it requires shared understanding.

When teachers, students, school leaders, and families share a common language about learning, conversations become more meaningful. Decisions become clearer. Expectations align. Learning becomes more transparent.

This book provides a foundation for that shared understanding by explaining the core principles of how learning works.

## *Moving Beyond Myths and Assumptions*

Many common beliefs about learning feel intuitive but do not reflect how memory actually works. Ideas such as learning styles, repetition without retrieval, cramming, or equating engagement with learning persist because they seem reasonable.

But when teaching is based on assumptions rather than evidence, opportunities for deeper learning are missed.

This book helps clarify what research shows—and why some familiar practices may need to be reconsidered.

## *Supporting Teachers*

Teachers have always worked with the best knowledge available to them. The Science of Learning simply provides clearer insight into processes that were previously invisible.

This knowledge empowers teachers by offering tools and explanations that make teaching more effective and predictable.

When the outcomes become clearer and more apparent, teachers can find more joy in their work, the connection between students and teachers improves, the well-being increases and many of the key challenges teachers face become more manageable.

## *Helping Students Become Better Learners*

This book is also about students.

When learners understand how learning works, they can adopt more effective strategies, persist through challenges, and take greater ownership of their learning.

Education becomes not only about what students learn, but about how they learn. This book provides many practical tools that can be shared with the students to increase their metacognitive understanding of their own learning.

## *Providing Practical Guidance*

The ideas in this book are not meant to remain theoretical. Each principle has practical implications that can be applied in classrooms immediately.

The goal is to support teaching that is:

- clearer,
- more effective,
- more aligned with how memory works,
- more supportive of long-term understanding.

Small changes, grounded in evidence, can have large effects.

## *Encouraging Reflection and Dialogue*

This book is not a set of rules. It is an invitation to reflect, discuss, and explore.

Different contexts require different approaches. The principles presented here provide a framework for thinking about learning, not a script to follow.

The aim is to support thoughtful, informed teaching.

## *A Long-Term Vision*

Ultimately, this book exists to support a broader vision of education—one where teaching is guided by understanding, where learning is durable, and where students develop the knowledge and skills they need for the future.

When education aligns with how the brain learns, the results are more meaningful for everyone involved.

## *An Invitation*

As you continue reading, consider how these ideas connect to your own experience. Notice where they confirm what you have observed and where they challenge familiar assumptions.

This book invites you to see learning with new clarity—and to use that understanding to support meaningful change.

The journey begins with understanding.

# How to Use This Book

This book is designed to be practical, flexible, and useful in different contexts. You do not need to read it in a single sitting, and you do not need to read it alone.

It is a guide, a reference, and an invitation to reflect on how learning works and what that means for teaching.

## *Read It as a Journey*

The chapters are organized to build understanding step by step.

The early sections explore why learning is often misunderstood and how the mind works. Later sections focus on evidence-based principles and practical implications for teaching. The final chapters look at how to apply these ideas in classrooms and schools.

Reading from beginning to end provides a coherent overview, but each chapter can also stand on its own.

## *Use the Chapter Summaries*

At the beginning of each chapter, you will find a short summary highlighting the key ideas and takeaways.

These summaries are designed to help you:

- quickly understand the main message,
- preview the content before reading,
- revisit key points later,
- support discussion with colleagues.

If you are short on time, you can read the summaries first and return to full chapters as needed.

## *Read at Your Own Pace*

There is no need to rush. Taking time to reflect helps deepen understanding. You may find it helpful to read a chapter, try a small change in practice, and then return to the next section. Learning about learning is a gradual and meaningful process in itself.

## *Use It as a Reflection Tool*

This book is most valuable when it prompts reflection.

As you read, consider questions such as:

- How does this align with my experience?
- Where have I seen this in my classroom?
- What might I try differently?
- What questions does this raise?

Reflection connects ideas to practice.

## *Discuss With Colleagues*

Many of the ideas in this book are best explored through conversation.

Reading together with colleagues, discussing chapters, and sharing experiences can deepen understanding and support implementation. Shared discussion also helps create a common language about learning.

This book can be used in professional learning communities, workshops, or informal conversations.

## *Try Small Changes*

You do not need to implement everything at once.

Choose one or two ideas that resonate with you and try them in your classroom. Observe what happens. Reflect on the results. Small steps lead to meaningful change over time.

The goal is progress, not perfection.

## *Revisit Key Sections*

You may find it helpful to return to certain chapters after gaining experience with the ideas. Understanding often deepens with revisiting, especially when concepts are connected to real classroom experiences. This book is meant to be used more than once.

## *Use It with Students*

Some concepts can also be shared directly with students. Helping learners understand how memory works, why effort matters, and how to study effectively can empower them to take greater ownership of their learning.

Learning becomes more transparent and collaborative.

## *Adapt to Your Context*

Every classroom and school is unique. The principles in this book provide guidance, but they are not rigid rules. Use your professional judgment to adapt ideas to your students, subjects, and context.

Effective teaching combines evidence with experience.

## *Keep Curiosity Alive*

This book is a starting point, not a final word. The science of learning continues to grow, and each classroom offers new insights. Staying curious and open to learning ensures that practice continues to evolve.

## *A Companion for Practice*

Think of this book as a companion—a resource you can return to for ideas, reassurance, and reflection. Its purpose is not to prescribe, but to support thoughtful teaching grounded in how learning works best.

The most powerful learning happens when understanding meets action.

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