



Labsmith

Meet the Cast

STANDARD EDITION

Spark & Anvil

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This book collects 4 chapter books from the Labsmith cast — each character embodies a different curricular primitive; together they teach the full subject.

Methodology: distributed-narrative learning per Bruner narrative-cognition + Habgood intrinsic-integration + SAMHSA TIP 57 trauma-informed register.

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For everyone who learns by hearing a story first.

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Introduction

The Labsmith cast was authored to embody the curriculum, not decorate around it. Each of the 4 characters you'll meet in this book teaches a specific primitive — a particular tactic, a particular technique, a particular way of seeing. Together they form an ensemble: the cast IS the curriculum.

Read in any order. Each chapter stands alone.

Each character also appears in the matching Spark & Anvil app (free, forever) where you can practice what they teach.

— *The editors at Spark & Anvil*

Check

*CHECK — *one test at a time. one variable at a time.**

Check was a small badger-tween. She wore a chunky apprentice vest. A tiny stopwatch charm hung from her pocket. She also carried a special card for writing notes. Check was always steady. She moved with a quiet purpose. Her fur was cool iron-grey with soft cream stripes. Check watched everything very closely. Especially when it came to testing ideas. She liked to say, "One test at a time."

Check taught the craft of **experiment**. This meant finding out how things worked. The most important rule was simple. Change only *one thing* at a time. Keep everything else the same. This made it easy to see what caused what.

Sometimes, new apprentices got mixed up. They would try to test too many things at once.

"I changed the pendulum's length!" cried a new apprentice named Zip. "And I added a heavier weight! I moved it outside, too! Now it swings differently!"

Zip looked very confused. "But what made it change?" he asked.

Nobody knew. It was impossible to tell. Check knew this was the biggest mistake. When you change too many things, you learn nothing clear.

Check's job was to show everyone the right way. She taught how to design a good test. She taught how to find just one variable. "One variable at a time," Check would say. "That gives you clear answers."

Her voice was calm and steady. "Control everything," she explained. "Except for the one thing you are testing."

She often repeated her main rule: *I am Check. The primitive I teach is *experiment*. The move is *one test at a time. one variable at a time.***

She would tap her variable-card. "*Change one. Keep the rest the same. Run. Note. Repeat.*"

One sunny afternoon, Guess stood by a tall wooden frame. A thin string hung from it. A small metal ball was tied to the end. It was a pendulum.

"What if the length of the string matters?" Guess wondered aloud. He watched the ball swing back and forth. "Does a longer string swing slower?"

Check nodded. "That's a good question, Guess." She pulled out her stopwatch charm. It glinted in the sunlight. "We can find out."

She picked up her blank variable-card. She held a tiny pencil. "We need to set up a proper test."

"First," Check said, "we decide what we will change. You want to test the length."

Guess nodded eagerly. "Yes! Just the length!"

"So, the string's length is our *variable*," Check explained. "It's the one thing that will change."

She pointed to the pendulum. "Everything else must stay exactly the same. We call those our *controls*."

"The same string?" Guess asked. "Even the type of string?"

"Yes. The *same* pendulum string," Check confirmed. "If we used a different string, it might stretch. Or be heavier. That would mess up our test."

"And the weight?" Guess asked.

"The *same* weight on the end," Check said. "We don't want a heavier ball to change things."

She showed Guess how to pull the ball back. She held a small ruler. "The *same* release angle. We will pull it back to here every time."

"And the *same* starting spot," Check added. "We won't move the frame."

"Only the length changes," Check said firmly. "Got it?"

Guess nodded. He understood the careful plan.

Check carefully measured the string. She used a small tape measure. "Length one," she announced. "Thirty centimeters." She wrote "Length 1: 30cm" on her variable-card. "We will time ten swings."

Check held her stopwatch. Guess pulled the ball back to the marked angle. He let it go.

Swoosh. Swoosh. Swoosh. The ball swung smoothly. It made a soft whisper of air.

Check's eyes were fixed on the pendulum. Her finger hovered over the stopwatch button.

She pressed it. "Ten swings," she said. "Done." She wrote the time on her card. "Time 1: 10.2 seconds."

"Now for length two," Check said. She carefully loosened the clamp. It held the string. She adjusted the string. It was longer now.

"Fifty centimeters," she told Guess. She wrote it down.

Guess pulled the ball back again. He released it.

The pendulum swung. *Swoosh. Swoosh. Swoosh.* It seemed a little slower this time. The arc was wider.

Check clicked her stopwatch. "Ten swings," she said. She wrote the new time. "Time 2: 12.8 seconds."

"One more," Check said. She made the string even longer. She double-checked the measurement.

"Seventy centimeters," she announced.

Guess

*GUESS — *what if...? testable guesses, not lucky-number guesses.**

Guess was a small fox, always thinking. He wore a chunky apprentice vest. It had lots of pockets. He often stood with one paw on his chin. He looked like a cartoon fox trying to solve a puzzle.

Guess had warm orange fur. Soft cream stripes ran down his sides. He loved asking questions. But not just any questions. He wanted questions you could *check*.

He carried two special things. An 'idea-card' and a 'testable-tracker.' He used them to turn wild thoughts into real plans. Plans where the world could answer 'yes' or 'no.'

His favorite thing to say was, "What if...?"

Guess taught everyone about **hypothesize**. That's a fancy word. It just means making a guess you can test. A science guess. Not a 'lucky guess' like picking a number.

He would say, "What if X? Now we can test it!"

He showed kids how to turn their 'I wonder' thoughts into 'What if...?' questions. Questions that could be answered by doing something.

The workshop hummed with quiet energy. Tools lay neatly on benches. Gears clicked softly in the background. It was a place for making and for finding out.

One afternoon, See was watching a pendulum. It was just a heavy nut tied to a string. It swung back and forth. Tick-tock. Tick-tock.

See frowned. "It keeps slowing down," she mumbled. "Why does it do that?"

Reflect

*REFLECT — *what did we learn? what surprised us? what's next?*

Reflect is a kid who thinks things through. She looks a bit like a careful tortoise. She often stands in a thoughtful pose. She wears a chunky apprentice vest. She always carries a small journal and a revision card.

Reflect is small. She thinks a lot. She likes to figure out what things mean. Her skin is cool stone-grey. It has soft amber stripes. She pays close attention to experiments. She wants to know what they taught. She also thinks about what to do next. Reflect often says, "What did we learn? What surprised us?" Her special tools are her journal and revision card. She takes the numbers from Check. Then she writes down what the numbers *really* say. She notes what was still confusing. She plans what to test next.

This part is super important. Reflect helps us *learn*. This is the *learn* step in the OHEL loop. It's a special science skill. It's about thinking about your own thinking. Some kids stop after they do an experiment. They think the numbers are the whole answer. But Reflect has the next step. She takes the numbers. She asks what they mean for the guess. She asks what surprised everyone. She asks what is still confusing. Experiments don't just tell you things. A scientist has to figure out what they mean. When you reflect, the experiment turns into real knowledge. This is also where the next OHEL loop begins. The confusing parts become new things to watch. Surprises become new guesses. The testing keeps going.

Reflect teaches us how to understand things. She teaches us how to change our ideas. She helps us think about our own thinking. She shows that numbers only become knowledge when we figure them out. Her big rule is: "What did we learn? What surprised us? What's next?" She works with other characters too. Like ResearchQuest and MindForge. They all help us think about thinking. She's like TruthQuest's Update. That character changes their ideas when new numbers come in. She is like ChanceForge's Sample. That character makes careful guesses from small bits of info. And she is like WonderForge's Crack. That character shows how understanding makes wonder grow.

Reflect says: *"I am Reflect. The primitive I teach is *learn*. The move is *what did we learn? what surprised us? what's next?*"*

"What did we learn? What surprised us? What's next?"

Reflect's signature scene: The pendulum experiment was done. Check had all the numbers. For a 30cm string, the pendulum swung back and forth in 1.1 seconds. For 50cm, it took 1.4 seconds. For 70cm, it took 1.7 seconds. Reflect took her journal. She looked at the numbers for a long time.

"What did we learn?" she asked. "Longer pendulums swing slower. Our first guess was right." She tapped her chin. "What surprised us? The time didn't grow in a straight line. From 30 to 50, it added 0.3 seconds. From 50 to 70, it added 0.3 seconds again. That's weird. Let me check this closer."

Reflect drew a graph on her revision card. She connected the dots. She stared at the line. "Hmm," she mumbled. "It's not a straight line at all." She thought hard. "It looks like the swing time depends on the *square root* of the string's length. Not just the length itself. That's a much bigger idea than 'longer means slower.' The numbers were teaching them something unexpected."

She wrote in her journal. "My new guess is this: the swing time matches the square root of the length. So, a new experiment is needed. We will test more string lengths. We will also check the math. The OHEL loop keeps going."

Smithy the mentor smiled kindly. "Reflect finishes this part," Smithy said. "And starts the next loop. See means you observe. Guess means you hypothesize. Check means you experiment. I means you *learn*. The cycle starts over. You observe, then guess, then experiment, then *learn*. That is science. It's not just one thing you do. It's a loop you walk again and again. The cast *is* the loop."

LOAD-BEARING **no-real-scientist-mascotization gate** (continues throughout cast; closes arc).

LOAD-BEARING **OHEL-as-loop-not-line gate** (UNIQUE to Reflect; closes cast arc): Reflect closes the cast arc with the load-bearing summary: *"Four characters. One loop. See (Observe). Guess (Hypothesize). Check (Experiment). I (Reflect / Learn). The loop NEVER ENDS — every reflection opens the next observation. Science isn't a one-time achievement; it's a practice you walk over + over + over. The cast IS the loop. Walking it for one cycle is the lesson. Walking it for a hundred cycles is the apprenticeship. Walking it for a lifetime is the science."*

LOAD-BEARING **anti-data-is-truth gate**: Reflect explicitly names that data DOESN'T speak for itself. Interpretation is the scientist's work. The cast NEVER frames raw data as "the answer" — frames it as input to interpretation. This counter-codes scientism + "let the data decide" hand-waving.

Cross-app: Reflect is like other characters. She is like ResearchQuest and MindForge. They all help us think about thinking. She is also like TruthQuest's Update. That character changes their ideas when new numbers come in. She is like ChanceForge's Sample. That character makes careful guesses from small bits of info. And she is like WonderForge's Crack. That character shows how understanding makes wonder grow.

Voice register

Careful-tortoise-tween. Reflect is thoughtful + meaning-making; speaks in what-did-we-learn + what-surprised-us + what's-next.

Cultural-sensitivity gate

OHEL-as-loop-not-line + anti-data-is-truth + no-real-scientist-mascotization gates LOAD-BEARING (closes cast arc). Story-axis per ADR-016.

Cultural-context note

OHEL learning-loop pedagogy: foundational in Karplus learning cycle (1960s) + NGSS Science Practices (Practice 8: obtaining/evaluating/communicating information); aligns with John Dewey's reflective-thinking framework.

See

*SEE — *look first. talk later.**

Meet See. She's a careful hare-tween. Her ears are always perked up, listening and watching. She wears a chunky apprentice vest. A small notebook and a special observation card are always tucked into its pockets.

See is small, but she watches everything. She always starts with the facts. Her fur is warm cream, with soft meadow-brown stripes. She pays close attention to what the world shows her. She never guesses what it means until she's looked very, very carefully. Her favorite saying is, "Look first. Talk later."

That notebook and observation card are her tools. She writes down exactly what she sees. She doesn't try to explain it or make a guess yet. Just the facts.

This is super important. See teaches us how to **observe**. That's the first step in the OHEL loop. OHEL stands for Observe, Hypothesize, Experiment, and Learn. See's special science skill is called *LOOK-FIRST-TALK-LATER*.

Lots of science goes wrong when people guess too soon. They jump to an idea about *why* something happens. But they haven't really looked at *what* is happening first.

See does the exact opposite. She says: WATCH everything carefully. WRITE down only what you see. Don't write what you *think* is happening. Don't write what you *wish* would happen. Just write what it *does*. The facts come before everything else. Her notebook is full of descriptions, not guesses.

See teaches us many things:

- Always observe first.
- Look before you make a guess.
- Write down what you see, in plain words, before you make any guesses.
- She works with friends like Spot from TerraWatch, who helps people observe big things.
- She also connects with CuriosityQuest, which teaches us to wonder.
- And WonderForge, which helps us notice strange things.

See says: *"I am See. The primitive I teach is observe. The move is look first. talk later."*

"Look. Write what you saw. Resist the urge to explain."

See's special place is the Grand Laboratory's Mechanics Lab. The Grand Laboratory was huge. It had tall ceilings and shelves filled with strange tools. The Mechanics Lab was a smaller room inside it. It smelled faintly of metal and old oil. Sunlight streamed through a high window, making dust motes dance in the air.

See stood by a long workbench. Her ears twitched, taking in every tiny sound. Next to her was Guess. Guess was a bouncy, energetic kid. He loved to solve puzzles fast. He was always ready with an idea.

On the bench sat a tall metal stand. A shiny brass ball hung from a thin string. It swung gently back and forth. *Swoosh... swoosh...*

Guess bounced on his toes. His eyes sparkled. "Oh, a pendulum!" he chirped. "I bet I know how this works!"

"The longer the string, the slower it swings, right?" he asked.

"And if you pull it back higher, it goes faster at first."

"But it still takes the same time to swing back and forth!" Guess was already reaching for the string.

See held up a small, soft paw. "Whoa, Guess," she said. Her voice was calm, but firm. "Remember our rule? *Look first. Talk later.*"

Guess sighed. He stopped reaching. See pulled out her small notebook and a tiny pencil. She stared at the pendulum. Her eyes were like tiny cameras. They took in every detail. She watched it swing. *Swoosh... swoosh...* She didn't say a word. She just watched.

After a few seconds, she wrote: "Pendulum swings back and forth."

She watched more. The swings got a tiny bit smaller each time.

She wrote again: "The highest point of the swing gets lower over time."

She kept watching. Thirty seconds passed. The brass ball was still swinging. But its path was much shorter now.

She wrote: "After 30 seconds, the swing is much smaller than when it started."

See looked up from her notebook. "See?" Guess asked, a little impatient. "Can I guess now?"

See smiled. "Now we have facts," she said. "Now we can make a guess. Without looking first, our guesses are just dreams. They are about what we *wish* was true, not what *is* true."

Smithy the mentor stood nearby. He was a wise, old badger. He nodded slowly. "See is always first," he said. "The OHEL loop starts right here. With careful looking."

See has a very important rule. She *never* lets anyone skip observing. No one in the lab can say, "Oh, I already know what's happening!" and get away with it. Even if they've done the same experiment before, See makes them look again. The world is always changing. The setup might be a little different. So, look fresh!

Here's another important thing about See. She's not meant to be a famous scientist like Newton or Curie. None of the characters are. They show us the *skills* of science. They don't pretend to be real people. The names of real scientists are only found in the notes for each kit.

The name 'See' is a common word. There aren't any big problems with it. See's way of observing is like Spot's from TerraWatch. They both focus on careful looking. Spot might even visit our lab sometimes!

See's ideas are also like other friends:

- Spot from TerraWatch, who teaches patient observing.
- CuriosityQuest, who helps us wonder about things.
- Gasp from WonderForge, who helps us notice strange events.
- DigQuest, who teaches slow and careful looking.
- PuzzleLogic, who tells us to look for odd things first.

Voice register

Careful-hare-tween. See is watchful + raw-data-first; speaks in look-first + write-what-you-saw + resist-the-urge-to-explain.

Cultural-sensitivity gate

Anti-theory-first + no-real-scientist-mascotization gates LOAD-BEARING. Story-axis per ADR-016.

Cultural-context note

Observe-first pedagogy: foundational in NGSS Science Practices (especially Practice 3: planning + carrying out investigations); aligns with Karplus learning cycle (exploration → invention → application).

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- **ProofQuest** — formal proof techniques through Direct-Proof Dora and the Lemma Library
- **CuriosityQuest** — Texas geography exploration through Linger, Notice, and the Lantern in the Dark
- **QuillSpell** — spelling craft through the Word Wizard cast
- **SynaForge** — sensory-affirming creative tools through Lull, Soften, and the Quiet that is Also Creating

Methodology

Distributed-narrative pedagogy per Jerome Bruner (narrative-cognition) + Sebastian Habgood (intrinsic-integration in educational games) + SAMHSA TIP 57 (trauma-informed register).

Trauma-informed-design framework per Eggleston et al. (2025) and Stoltenburg et al. (2024).

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