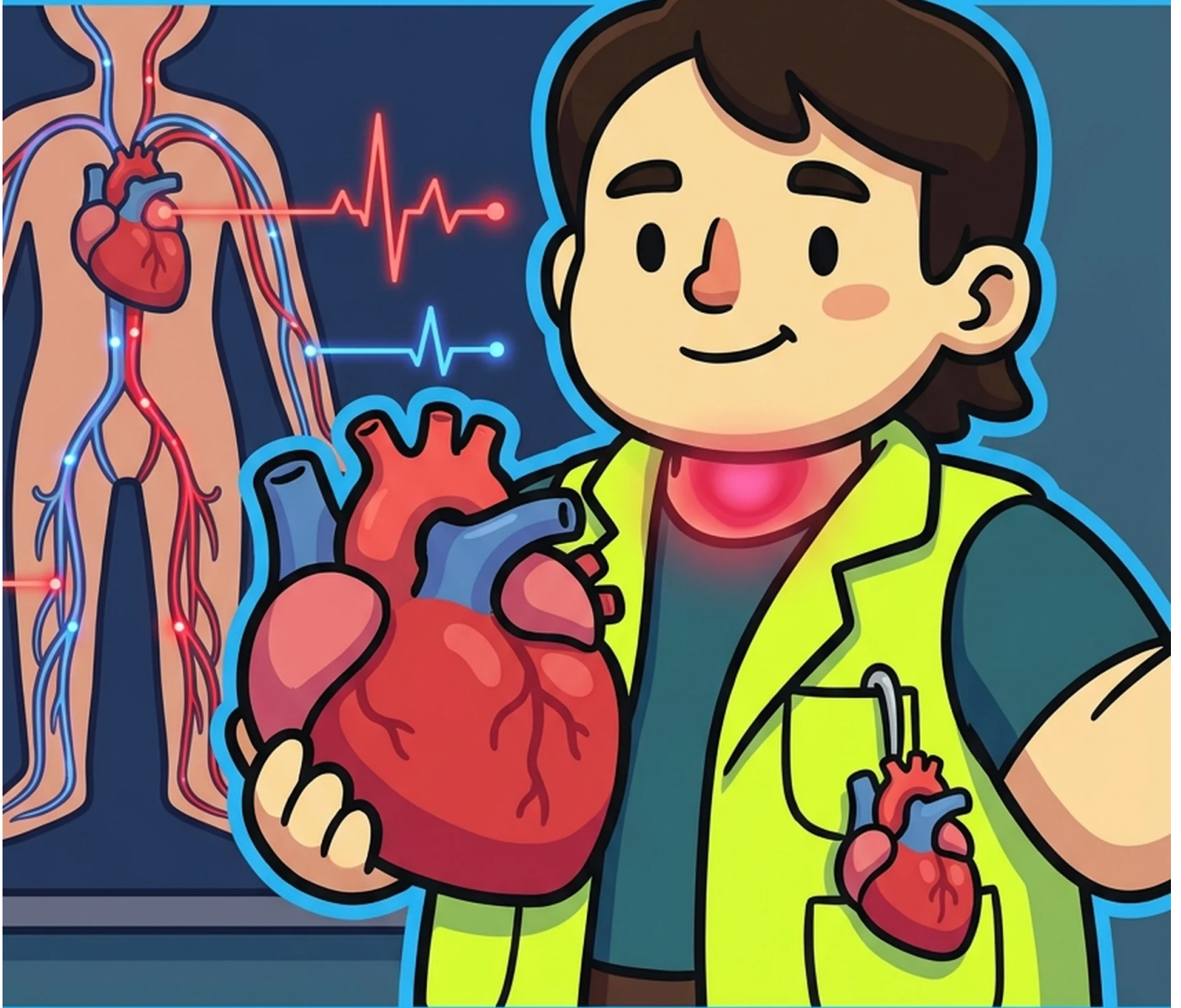




BioForge

Meet the Cast

Standard Edition

Spark & Anvil

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This book collects 6 chapter books from the BioForge 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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This is Volume 1 of 2 of the *BioForge — Meet the Cast* series; each volume is a complete standalone book you can read on its own.

For everyone who learns by hearing a story first.

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Introduction

The BioForge cast was authored to embody the curriculum, not decorate around it. Each of the 6 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*

Pump

PUMP — the heart moves blood to every cell. circulation is delivery.



Halfway up the ridge above Bioforge, Pump stopped running, put both hands on their knees, and grinned like they'd just been handed a present.

They were round and strong, in a chunky red vest, and their chest was going *thump-thump, thump-thump* so hard you could almost see it. A younger kid named Alex staggered up behind them, gasping, sure something had gone wrong.

"Are you okay?" Alex wheezed. "Your heart's, like, exploding."

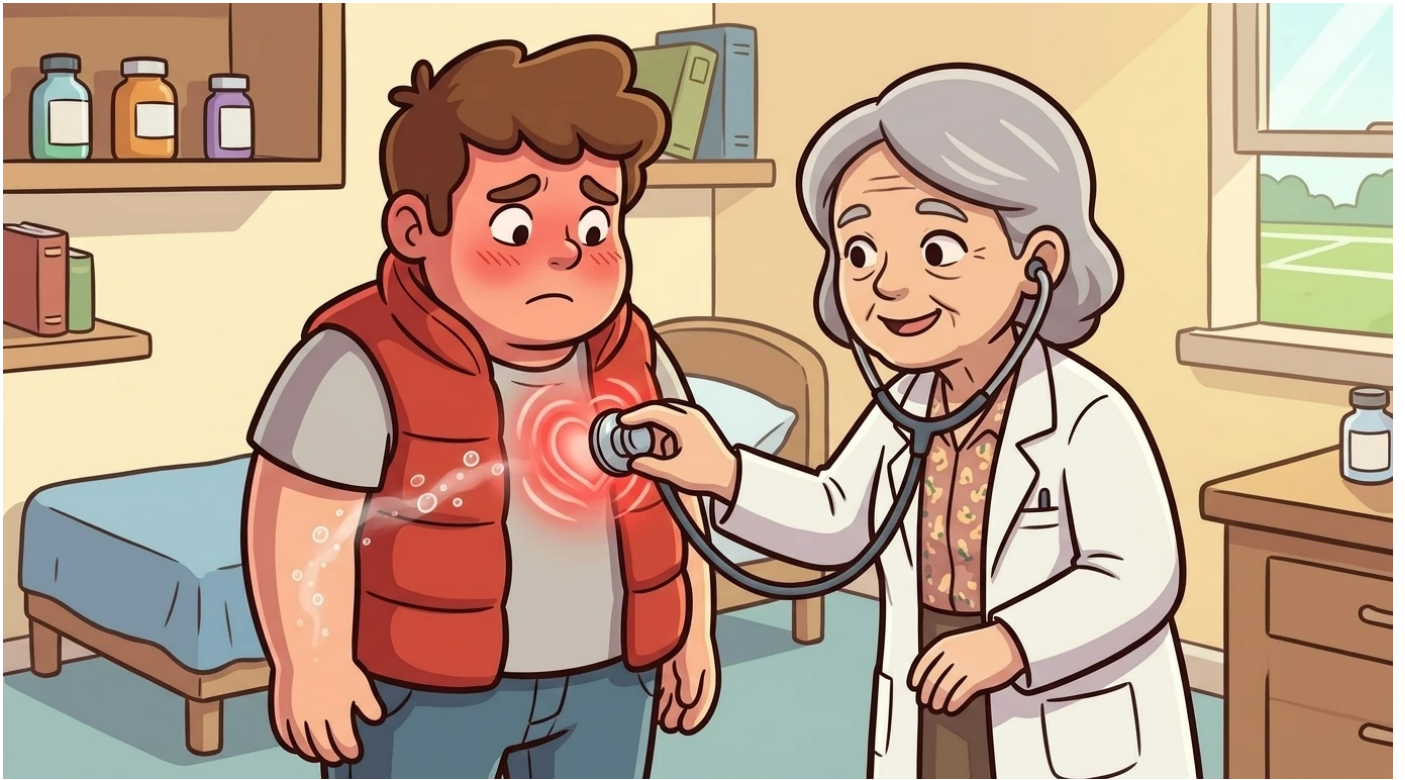
"It's *working*," Pump said happily, still catching their breath. "Feel yours."

Alex pressed a hand to their own chest. It was pounding too, fast and warm.

"That," said Pump, "is the best delivery service in the world, and it just kicked into high gear." They straightened up and pointed down the slope, then out across the whole valley. "Every one of your muscles just asked for more oxygen. And your heart said *coming right up* — and started sending it, cell by cell, to every part of you at once. It didn't miss one. It never does."

Alex looked at their own arm, then their legs, like they'd never met them. "It goes... everywhere?"

"Everywhere." Pump tapped their own wrist, then Alex's ankle, then the top of Alex's head. "Fingertip. Toe. The very back corner of your brain. There is no place in you too far away. The heart doesn't have a favorite. It just keeps the whole river moving." They took a slow breath and their thumping eased, softer now, steady as a drum. "Come on. Let me show you the map."



Pump hadn't always loved that pounding feeling. When they were small, they'd hated it.

They'd been the slowest runner in their class, and every time the pack pulled ahead, their heart would slam so hard against their ribs it scared them. *Something's wrong with me*, they'd think, red-faced at the back, sure that the thumping meant they were broken and everyone else was built better.

It was the school nurse — an old woman with cool hands and a stethoscope worn smooth — who fixed that. She never told Pump to run faster. She just pressed the little cold disc to Pump's chest after a hard lap and said, "Listen to that. You hear how strong that is?"

Pump had listened, embarrassed. *Thump. Thump. Thump.*

"That's not something going wrong," the nurse said. "That's your heart delivering harder because your legs are asking harder. It's the fittest sound in the world, and it's coming from *you*." She'd smiled. "Fast runners don't have magic. They have a heart that got good at delivery. Yours is getting good right now, this second, whether you win the race or not."

Pump didn't win a single race that year. But the pounding stopped feeling like an alarm. It started feeling like proof — that something inside them was answering, every time, no matter what shape they came in.



Pump walked to Bioforge at twelve, because a place that studied living things ought to understand the thing that kept every one of them alive.

Dr. Vega, who ran the anatomy workshops, met them at the door and didn't ask them to run, or lift, or measure anything. She asked one question. "What does the heart actually *do*?"

Pump didn't answer with words. They picked up a jug of red-tinted water and a long looping length of clear tubing that ran out to a dozen little cups, one for each corner of the room. They poured — and squeezed the pump-bulb in the middle, once, twice, steady as a heartbeat. The red water pushed out along every branch of the tube at once. One by one, the far cups filled. Not one was skipped.

"It's not a container," Pump said, squeezing again. "It's a *deliverer*. The blood carries oxygen and food and messages, and the heart makes sure every cup — every cell — gets its share. Then the same water comes back carrying the waste, and goes out to the lungs to trade it for fresh oxygen, and the loop just... keeps going. Forever. No cup left dry."

Dr. Vega watched the last cup fill and go still. "You belong here," she said.



Pump's workshop had a whole wall that was one glowing map of a body — red roads and blue roads branching into threads too fine to see.

A girl came in one afternoon with her arms crossed, upset. Gym class had ranked everyone by how they looked in the mirror, and she'd come out near the bottom. "I'm just not a fit kind of body," she said. "You can tell by looking."

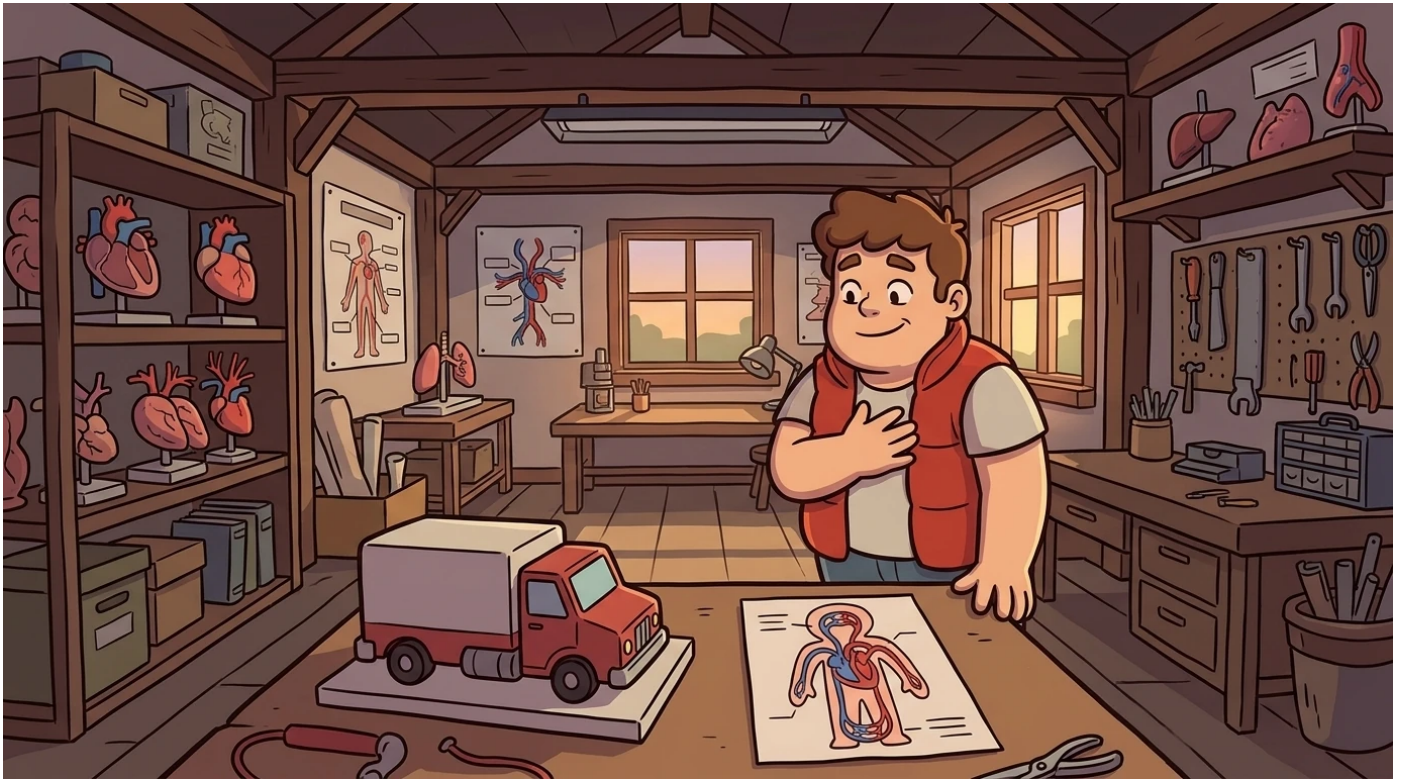
Pump tilted their head. "Can you? Put your hand here." They set the girl's fingers against the side of her own throat. "Feel that?"

"...My pulse."

"Count it. That's your heart delivering, right now, while you're just standing here mad at a mirror." Pump traced a red line up the map with one finger, from the heart out to a distant, branching corner. "Fitness doesn't live in the mirror. It lives *here* — in how well this river reaches every cell, and how strong your heart gets at pushing it. That's called cardiovascular fitness, and you cannot see it from the outside. Not one bit of it."

The girl frowned at the map, then at her own pulsing throat. "So how do you get better at it?"

"You ask your heart for more." Pump grinned and pointed at the door, at the ridge beyond it. "You run, you climb, you swim, you dance — anything that makes it go *thump-thump* like it means it. Every time you do, the muscle gets a little stronger, and it learns to deliver more with each beat. Tall kid, round kid, short kid — doesn't matter. Every single one of you has a heart that gets stronger the same way." They squeezed the pump-bulb again, and the red water raced out to every cup. "The mirror doesn't get a vote. Your heart does all the voting. And it votes *yes* every single second."



Later, when the workshop had gone quiet, the girl paused at the door. She had one more question, softer than the first.

"When I'm just sitting here," she said, "not running, not doing anything — is it still working?"

Pump pressed a hand flat to their own chest and held very still, so the room went silent enough to almost hear it.

"Right now," they said gently. "While we talk. While you sleep tonight. While you're bored in math class next week. It has never once stopped, not for a single beat of your whole life, and it never asks you to notice." They smiled. "That warm, tired, still-going feeling in your chest after a hard run — that's the honest sound of being taken care of, from the inside, by something that only knows how to keep giving."

The girl put her hand back to her throat and just felt it a while. *Thump. Thump. Thump.* And Pump watched the crossed arms come loose, the same slow way their own shoulders had let go, years ago, at the back of a race they didn't win.

They didn't say the rest out loud, but they thought it, warm and certain: *nobody is the wrong shape to be delivered to. The river reaches everyone. It always has.*

Pump and Bellows

cardiopulmonary loop — the heart and lungs work as one circuit. Tired blood goes from heart to lungs, drops off carbon dioxide, picks up oxygen, and rides the heart back out to the body. Gas exchange only reaches your cells because the two partners hand blood back and forth without stopping.



Deep in the bioforge, two work stations sat so close their chairs almost touched, and a wide glass tube looped between them like a racetrack that never ended. At the left station, Pump sat with both hands on a big steady lever, pushing it in a slow, even rhythm. *Lub-dub. Lub-dub.* Each push sent a rush of dark, tired-looking fluid down the tube, off toward the right.

At the right station, Bellows swayed like someone humming a very long song. Every time the dark fluid arrived, they spread their arms wide, took an enormous breath, and the fluid brightened — turning from a dull blue-red to a cheerful, brilliant scarlet before it whooshed back around the loop to Pump.

"Coming your way," Pump said, not breaking rhythm. "Tired batch. Went all the way to the toes and back. It's carrying a lot of leftovers."

"I've got it, I've got it," Bellows breathed, arms opening. "Drop the old, pick up the new. Same as always." They pulled in air, and the fluid glowed. "There. Fresh. Send it wherever it needs to go."

Pump caught the bright fluid and pushed it out the far side of the loop, back into the body. *Lub-dub.* "And around we go again," Pump said, almost proud. "I never stop, you know. Not once, my whole life."

"I know," said Bellows warmly. "Neither do I. We're a we."



Bellows liked to tell the story of the day they first understood it, and Pump, who had heard it a hundred times, never once told them to stop.

"When I was new," Bellows said, arms rising and falling, "I thought I could work alone. Breathe in, breathe out, all that lovely air. I filled myself up with the freshest oxygen you ever saw." They laughed a small, breathy laugh. "And then — nothing happened. The air just sat in me. It had nowhere to go. No cell in the whole body got a single bit of it."

Pump nodded along, pushing the lever. *Lub-dub.*

"And me," Pump said, "I thought the same. Push, push, push — I could send blood to the very tip of your smallest finger. But it was the *same tired blood*, round and round, getting more tired every trip. No fresh air in it. The body started to ache." Pump's rhythm stayed steady, but their voice went quiet. "That's the day I found Bellows. Or Bellows found me. The tube was already there between us. We just hadn't started using it."

"So we did," said Bellows. "You bring me the tired blood. I trade its old, used-up air for new. You carry the fresh blood out. I can't reach the toes. You can't make new air. But together—"

"Together the toes get oxygen," Pump finished. *Lub-dub.* "Every second of every day."



An alarm chimed — a soft, rising *whoop-whoop*. On the big screen above the loop, a figure was running, fast, up a long hill.

"Ah," said Pump, sitting up. "Somebody's exercising. The muscles are shouting for more."

"More air, more air!" Bellows said, already breathing deeper and faster, arms flying wider than before. "Big breaths. In through here, out with the old — hurry!"

Pump pushed the lever quicker now, the *lub-dub* speeding into a gallop. "I feel it — the whole loop's running hot. The muscles burned through their oxygen and dumped a mountain of leftovers into the blood. Bellows, this batch is *heavy*."

"Then send it faster and I'll clean it faster!" Bellows called, laughing between breaths. The dark fluid came rushing, and rushing, and each time Bellows heaved it bright again and shot it back. The two of them moved together, faster and faster, perfectly matched — one heartbeat, one breath, one heartbeat, one breath — until the runner on the screen reached the top of the hill and slowed, and the loop cooled, and they both eased back down to their steady, quiet song.

"Whew," said Bellows, arms slowing. "Good work."

"Good work *back*," said Pump.



A young apprentice from the academy had been watching from the doorway, and now they crept closer, staring at the loop.

"I don't get it," the apprentice admitted. "Which one of you gives the body its oxygen? Is it the heart? Or the lungs?"

Pump and Bellows looked at each other and smiled the same smile.

"Watch the loop," Pump said gently. "Don't watch me. Don't watch Bellows. Watch what goes *between* us." They pushed the lever. "Here comes the tired blood — see how dark? Full of the leftovers the cells breathed out. Carbon dioxide. The CO₂. I'm carrying it to Bellows."

"And I open up," said Bellows, spreading wide, "and I let the CO₂ go out into the air — that's you breathing out — and I pull fresh O₂ in — that's you breathing in — and I press it into the blood." The fluid flared scarlet. "Now it's rich. Now it's ready."

"And I take it," said Pump, "and I carry it to every cell that's waiting." *Lub-dub*. "So — which one of us gives the body its oxygen?"

The apprentice looked from Pump, to the tube, to Bellows, and back to the tube. "...Neither," they said slowly. "Both. The *loop* does."

"There it is," said Bellows softly.



Later, when the bioforge was quiet and the screen showed the body asleep, Pump and Bellows kept working — slower now, but never stopping.

"Do you ever get tired of it?" the apprentice asked, lingering. "Doing the same thing forever?"

Pump thought about it, pushing the lever in the dark. *Lub-dub. Lub-dub.* "It's not the same thing," they said. "It's the same *partner*. That's different." They glanced at Bellows. "I push, and I know — I *know* — you'll be there to catch it. Every single time. I've never once had to wonder."

Bellows was quiet for a moment, breathing slow. "That's the part I love," they admitted, and their voice went soft and steady and sure. "Not the air. Not even the fresh blood. Just knowing you'll send it, and I'll be here, and neither of us has to do the whole thing alone."

Pump sent the next bright batch around the loop, and though they would never say it out loud, Pump's steady chest felt warm too — full and calm and glad, right down to the beat, glad in a way that had nothing to do with blood or air and everything to do with never, ever having to do it alone.

Bellows

BELLOWS — the lungs exchange gases. oxygen in, carbon dioxide out.



At the far end of the running field in Bioforge, a bat-tween named Bellows lay flat on his back in the grass, breathing like a bellows for the fire.

He had just chased a rolling ball the whole length of the field and lost. His wide wings were spread out, his round chest heaving, and the air went in and out of him so hard you could almost hear it — *hhaaa, hhoooo, hhaaa*. A younger kid jogged over, worried.

"Are you okay? You're breathing so loud."

"I'm okay," Bellows puffed. "I'm just... catching up." He held up one furry finger, asking for a second, and kept breathing. Slowly the *hhaaa* got softer. His chest stopped heaving. His breath went quiet again, the kind you forget you're even doing.

"There," he said, sitting up. "All caught up."

"Caught up on what?"

"Air." Bellows grinned. "When I ran, my body burned through the good stuff in every breath faster than I could pull it in. So it made me breathe harder — big loud gulps — until the swap caught up." He tapped his own chest. "In goes the fresh air. Out goes the used air. Every single breath does that little trade. When you run, you just need the trade to happen way, way faster."



Bellows hadn't always trusted his own breath.

When he was small, he'd had a night where he couldn't seem to get enough air. His chest felt tight, his breaths came short and quick, and the more he noticed it the worse it got. *Something's wrong with me*, he'd thought, curling up. *My breathing is broken. What if it just... stops?*

His aunt had folded a wing over him — an old bat with a low, calm voice — and she hadn't told him to relax. She'd just laid her hand flat on his belly.

"Feel my hand there?" she said. "I want you to push it up. Just push my hand up with your belly, slow."

He tried. A big muscle low in his middle pulled down, made room, and air came in — a real, full breath. His aunt's hand rose.

"Now let it fall," she said. It fell. Another breath came.

"That muscle is called your diaphragm," she said quietly, into the dark. "It's a pump. It's been pumping air into you your whole life, even asleep, even when you forgot about it. It didn't break tonight. It just got scared and hurried, same as you." She let him feel a few more slow ones. "Nothing's wrong with the machine. We're only slowing it back down."

Bellows breathed against her hand until the tightness let go. The scared, short, can't-get-enough feeling had a shape now: it was just the pump running fast and frightened. Somehow, knowing that, he could sit with it.



He walked to Bioforge at twelve, because a place that studied the body ought to understand the part of it that never, ever stopped.

Doctor Marrow, the old mentor who ran the anatomy workshops, met him at the door. She didn't ask him to prove he was strong. She asked one thing. "What do your lungs actually *do* in there?"

Bellows didn't answer with a definition. He pulled a small pink model from his vest pocket — it looked like a tiny tree branch, hung with clusters of grape-shaped sacs — and held it up so she could see the little bunches.

"They trade," he said. "In here." He touched the tiny sacs. "These are alveoli. There are hundreds of millions of them, way too small to see. Air comes down and fills them, and the fresh part of the air — oxygen — slips straight through the thin wall into the blood, quiet as anything. And the used part the blood's carrying — carbon dioxide — slips back the other way, into the sacs, and gets breathed out." He mimed a soft *whoosh*. "Fresh in, used out. Millions of tiny trades, every breath, all day, all night."

Doctor Marrow looked at the little pink model for a long moment. "You belong here," she said.



Bellows's workshop was full of kids learning to trust the pump inside them.

A girl came in one afternoon, hunched and quiet. "I don't have big lungs," she said. "I'm not skinny like the fast runners. So I figured mine must be... small. Not as good."

Bellows set his model down. He knew that hunch.

"Put your hand here," he said, laying his own palm flat on his round belly. She copied it on hers. "Now breathe in, slow, and push your hand out."

She did. Her hand rose.

"Feel that muscle pulling down, making room?"

"Yeah."

"That's your diaphragm. It just filled you right up." He tilted his head at her. "Did that breath feel small?"

She thought. "...No. It felt normal. Big, even."

"Right. Because lung capacity isn't about body shape — not one bit. It doesn't care if you're round or lean or anything in between." He tapped his own soft, strong chest, unbothered. "My lungs work great. Yours work great. Skinny lungs, chunky lungs — there's no such thing. There's just alveoli, doing the trade, in every kind of body there is." He grinned. "You breathe about twelve to twenty times a minute right now, resting. Chase a ball and it'll climb. Same lungs either way. Yours are amazing exactly as they are."

She sat up a little straighter and took a breath — a real, full one, just to feel it.



Later, when the workshop had emptied, the girl came back with one more question. She was quieter now.

"When it's just happening on its own," she said, "and I'm not even thinking about it... how do I know it's really working in there?"

Bellows thought about the night with his aunt's hand on his belly.

"You feel it," he said. "That's the honest answer. Lay a hand low on your middle and go still, and you'll feel the rise and the fall — that slow, steady, on-its-own feeling, like something patient taking care of you without being asked." He looked out the window toward the running field. "That's the trade happening. Fresh coming in, used going out, over and over, whether you notice or not. It kept going while you slept last night. It'll keep going while you forget about it tomorrow." He smiled at her. "The blood carries all that fresh air off to the rest of you — that's Pump's job, the heart. And learning to slow it down on purpose when you're scared, the way my aunt showed me — Breath teaches that one. But the trade itself? That quiet in-and-out?"

He put his own hand on his chest.

"That's just yours. It's been keeping you the whole time."

The girl breathed slow, and Bellows watched the worry lift off her shoulders — the same way, years ago, in the dark, his had.

Sprout

SPROUT — food becomes you. digestion converts; absorption distributes.



In the back garden of the Bioforge lab, a small tapir-tween named Sprout sat with a slice of apple in her hoof and did not eat it right away.

She turned it over. She sniffed it. She took one careful bite and chewed it far longer than seemed strictly necessary — twenty chews, maybe thirty — until the apple stopped being a chunk and became a soft, wet paste on her tongue.

A younger student watched from the bench, baffled. "You chew like you're being paid by the hour."

"I'm not chewing," Sprout said around the mouthful. "I'm starting the journey."

The student raised an eyebrow.

Sprout swallowed, then pressed a hoof flat against her own round middle. "This apple is about to travel thirty feet without ever leaving me. Down my throat. Into my stomach, where it gets churned and splashed with acid. Then into a long, folded tube where the good stuff — the sugar, the little bits of the apple that will become *me* — soaks straight through the walls into my blood." She grinned. "It takes a day. Maybe two. The apple stops being an apple and starts being Sprout."

"That's disgusting," the student said, delighted.

"That's *breakfast becoming a person*," Sprout said. "Every cell in me was lunch once. So I chew slow. I like to give the apple a proper send-off."



Sprout had not always trusted her own middle.

When she was smaller, she'd overheard some older kids talking about food the way you'd talk about an enemy — this food was "bad," that one you had to "earn," another you were supposed to "burn off" like it was a stain. She'd started eyeing her plate with suspicion, feeling a tight, ashamed knot every time her stomach growled, as if being hungry were something to apologize for.

An elder tapir named Marsh had found her one evening pushing food around her plate, not eating, stomach loud and unhappy.

Marsh hadn't lectured. She'd just sat down and said, "Your belly's talking. What's it saying?"

"That I'm hungry," Sprout mumbled. "But I don't think I'm supposed to be."

Marsh had laughed — not unkindly. "Little one, that growl isn't a problem. That's a body that *works*. Hunger is your cells asking for the parts to keep building you. You don't earn food and you don't pay it back. You're a garden. Gardens get watered." She'd tapped Sprout's plate. "Everything on here is going to take a long trip through you and come out as bone and blood and the muscle you'll use to climb tomorrow. That's not a debt. That's just how a body stays a body."

Sprout ate that night without the knot. The hungry feeling had a different name now: *building*. And building, it turned out, was something she could sit with warmly instead of fighting.



She came to Bioforge at twelve, drawn to the lab because it studied how living things actually *work* — and nobody there flinched from the beautiful, churning insides of that question.

Whisk, the mentor who ran the anatomy workshops, met her at the door with a bowl of soup and one test. "Tell me what happens to this soup."

Sprout didn't answer with a list. She took a slow spoonful, held it a moment, and swallowed. Then she started walking — tracing a line with one hoof from her mouth, down her throat, past her chest, curving down and around and around her own belly, all the way to the small of her back.

"It goes here first — chewed, wet, mixed with spit that's already starting to break the bread down." She pressed her stomach. "Then here, and it gets churned like laundry and soaked in acid until it's a warm slush." Her hoof traced the long coil. "Then the real work — this whole folded tube, longer than the room. This is where the soup soaks through the walls into my blood. The good parts leave the tube and go join *me*." She reached her back. "And what's left over keeps going, out the far end. Nothing wasted. Nothing rushed."

Whisk watched her trace the whole thirty feet and said quietly, "You belong here."



Sprout's workshop was full of stomachs — models, drawings, a coiled rubber tube she could stretch across the floor to show its true length.

A girl came in one afternoon, arms crossed, upset. "I ate a big lunch and now my stomach is all loud and busy and weird. I feel like I did something wrong."

Sprout knew that exact worry. She'd carried it once, on a bad evening with a full plate.

"Loud how?" she asked. "Growly? Gurgly?"

"Gurgly. Like it's mad at me."

"Come here." Sprout laid the long rubber tube out across the floor, all thirty feet of it, coiling it into a folded heap the size of a small dog. "That's the tube inside you. That gurgle isn't anger — that's *work*. Your stomach is squeezing, your gut is rippling, pushing the food along like toothpaste in a hose. The busy feeling is a whole factory running." She dropped a marble in one end of the tube and tilted it so it rolled the whole length. "See how it travels? Every squeeze moves your lunch a little farther, and all along the way the walls are pulling out the parts that'll build you — the fuel, the little repair-kits, the stuff your muscles want."

"So the loud part is... good?"

"The loud part is your body taking *excellent* care of you." Sprout tapped the girl's arm, gently. "And you've got tiny helpers in there too — billions of them, little living partners that live in your gut and help finish the job. They eat what you can't and they keep you healthy. You're never doing this alone. You're a whole community in there, all working on the same lunch."

The girl uncrossed her arms and pressed a curious hand to her own stomach, listening.



Later, when the workshop was empty, the girl came back with a smaller, quieter question.

"If the food turns into me," she said, "then... am I just made out of everything I've ever eaten?"

Sprout thought about Marsh, and the growling belly, and the plate she'd finally eaten without shame.

"Yes," she said, warm and certain. "Every bit of you was a meal once. The apple, the soup, the bread — it all took the long trip and stayed. You're not something separate from what you eat. You're *built* from it, slowly, quietly, one bite at a time."

The girl went still, and Sprout watched something settle in her — the same soft, un-knotted calm that had settled in Sprout years ago at Marsh's table.

"So the next time your belly gets loud," Sprout said, "you don't have to feel like you did something wrong. That warm, busy, working feeling? That's just you, becoming more of yourself. It's the kindest thing your body knows how to do."

The girl smiled, one hand still resting on her middle, feeling it work — and Sprout smiled back, glad, always glad, to send a good meal on its long way home.

Flicker and Sprout

cell-cycle pair — *Flicker is the moment of cell division (the rapid switch of mitosis). Sprout is the period of growth between divisions (interphase: G1, S, G2). Together they teach the rhythm of every multi-cellular life.*



- prompt: "Have you ever felt impatient waiting for something you really wanted, like Flicker? What helped you stay steady while the quiet part happened first?"

In a quiet corner of the bioforge, two glowing screens cast a soft, green light on two very different figures. At the left station sat Sprout, humming a slow, gentle tune. Their screen showed a single, plump cell, peacefully floating in a nutrient broth. It wasn't doing much, but Sprout watched it with the patience of a gardener waiting for a seed to grow. They occasionally tapped a control, sending a tiny puff of digital nutrients toward their charge.

Next to them, Flicker was practically vibrating. They bounced in their seat, fingers drumming on the console. Their screen was a whirlwind of activity, showing a cell in the middle of a fantastic, complex dance. Filaments of light pulled shimmering shapes apart, moving them to opposite ends of the cell.

"Is it time yet?" Flicker asked, eyes glued to Sprout's calm screen. "Is it ready? It looks ready."



Sprout leaned closer to their screen, adjusting a dial with a slow, careful twist. The image zoomed in, showing the surface of the single, round cell. It looked smooth and healthy. On a side panel, charts and graphs crept slowly upward, tracking protein levels and energy stores. To Flicker, it was the most boring sight in the whole lab. To Sprout, it was a masterpiece in progress.

"See?" Sprout said softly, pointing a steady finger at a blinking graph. "It's just finished copying its instruction manual. Every single page, twice. Perfect copies." They sounded deeply proud. "Now it's doing its final checks. Making sure there are enough power packs, enough building blocks. You can't build a new house without all the parts, can you?"



Suddenly, a soft chime rang out from Sprout's station. A light on their console turned from steady green to a pulsing, bright white. Sprout sat back, a satisfied smile on their face. "Alright, Flicker," they said. "The cloud is full. It's your turn to make it rain."

Flicker was a blur of motion. They zipped over to Sprout's console, their eyes wide with excitement. The image of the plump cell now filled both screens. "Here we go, here we go, here we go!" Flicker chanted. Their fingers flew across the controls, and on the screen, the real show began.



"Two!" Flicker shouted, throwing their hands in the air. "Perfectly done! A beautiful division!" The two new cells on the screen were small, exact copies of the one Sprout had been tending to just moments before. Flicker's job was over as quickly as it had begun. They looked around, already eager for the next one. "Okay, who's next? Which one is ready now?"

Sprout gently placed a hand on Flicker's shoulder. "Easy there, little lightning bolt," they said. "Look." Sprout pointed at the two new cells. "They're just starting out. They need time now. My time."



The two sat side-by-side, watching their respective screens. Sprout's monitor now showed a new, small cell, and they were already beginning the slow process of feeding it and helping it grow. Flicker's monitor showed the other new cell, also floating quietly. For now, their work was the same: waiting.

"It really is a rhythm, isn't it?" Flicker said, quieter now. "Your long, slow part, and my super-fast part."

Flicker

FLICKER — signals travel at lightning speed. nerves carry messages.



The moment the mug tipped off the workbench, Flicker's whole body flinched — hand out, catch, done — before the little firefly had a single thought about it.

The mug was safe in their glowing fingers. Flicker blinked at it, amber spots pulsing on their antennae. "Did you see that?" they said to the empty lab. Then, louder, to a passing lab-mouse who very much had not asked: "I *caught* that before I decided to catch it. My hand knew before I knew."

They set the mug down and did it again on purpose — nudged it, snatched it, nudged it, snatched it. Every time, the same thing: the catch came first, the thinking came after, like the thinking was always running a half-step behind the doing.

"That's the whole trick," Flicker murmured. They tapped the back of their own hand, where a thin line of warm light ran up toward their shoulder. "There's a message in here. It goes *ping* — mug, falling, GRAB — and it travels so fast I can't feel it move. It's already at my hand before the front of my brain has even caught up."

They hovered up to a wall covered in glowing threads, all of them branching out from a single bright knot at the top. When Flicker touched one thread near the bottom, a spark chased all the way up to the knot and back down — quick as a blink, quicker.

"See?" Flicker breathed, watching the light run. "Nothing in me *pushes* the mug-catch along. The message just goes. Signal in, signal back, faster than falling." They grinned at the mug. "You never had a chance."



Flicker had not always trusted the half-step.

When they were small, they used to hate how their body did things without asking. A loud clap and they'd jump. A hot pan near their hand and they'd snatch it back, embarrassed, as if their arm had gone behind their back and made a decision without them. It made them feel like a passenger in their own body — like the *real* them was slow, and some other thing was in charge.

An old glowing elder had found them once, sulking, snatching their own hand toward a candle and yanking it away, over and over, furious.

"You're angry at the fast part," the elder said. Not a question.

Flicker had nodded, miserable. "It doesn't wait for me. It just *does* stuff."

The elder held a warm palm near the candle and let their own hand flinch back. "That's a good little servant, that fast part. It's not ignoring you. It's *protecting* you — it moves before you can, on purpose, because burning is quicker than deciding." They smiled. "Your body built a shortcut. The message hits your hand and comes straight back without even bothering the top of your head. Not because you're slow. Because *this* is faster, and being fast is the whole job."

Flicker had stopped, hand mid-yank. The fast part wasn't stealing from them. It was on their side. It was so on their side it wouldn't even wait around to be thanked.

That was the day the flinch stopped feeling like a stranger and started feeling like a friend who never left.



They walked into BioForge at twelve, still glowing, still watching every branch and thread in the place.

The mentor who ran the labs met them at the door — an unhurried old creature with a slow voice. No test of strength. Just one thing set on the bench: a smooth grey model of a single nerve cell, long and trailing, with a tiny gap at its end.

"Tell me what this does," the mentor said.

Flicker didn't answer with words. They touched one end of the long cell. A ripple of amber light ran the whole length of it, reached the gap, hesitated — then *leapt* the gap in a little chemical shimmer and lit up the next cell along. Flicker touched it again. Again the ripple, the leap, the light.

"It carries the message," Flicker said. "All the way down the long part — that's the axon. Then it hits the gap. The little bridge, the synapse." They made a leaping motion with two fingers. "The message can't just jump the gap by itself, so it throws a chemical across, and the chemical carries it to the next one. Ping, leap, ping, leap. Your whole body is millions of those, wired together."

The mentor watched the light travel, and was quiet a while. "You belong here," they said.



Flicker's workshop filled up fast, because a lab full of glowing wires is hard to walk past.

A tall kid slouched in one afternoon, unimpressed. "My teacher says my body's basically a computer," they said. "Wires and signals. That's it. That's kind of sad."

Flicker didn't argue. They handed the kid a soft rubber mallet and pointed at their own knee. "Tap it. Right below the kneecap. Not hard."

The kid tapped. Flicker's leg kicked out on its own.

"Did I *decide* to do that?" Flicker asked.

"...No?"

"Right. That message never even went up to my brain. It hit my spine, turned around, and came straight back to my leg. A shortcut — a reflex — so fast it skips the boss entirely." They wiggled their nose. "Some things you choose — jumping, kicking a ball, wiggling your nose. Your brain sends the order out to your fingers and toes, along all the branching wires, and they obey. But some things your body just *handles* — breathing, heartbeat, the flinch, the kick. You don't vote on those. Thank goodness. You'd faint trying to remember to breathe."

The kid tapped Flicker's knee again, and laughed when it kicked.

"So yeah," Flicker said, softer now. "Signals. Wires. Electricity, almost as fast as light, running from your brain and spine out to every scrap of skin. That part *is* like a computer." They tilted their head. "But here's the thing I won't let anybody skip. You're not sad or happy *because* of wires. The wires carry it — they don't *decide* it. What you feel, what you've been through, who's kind to you — that's bigger than any signal. Your body's the messenger. It was never the whole message."

The kid stopped tapping and just looked at them.



Later, when the lab was empty, the kid came back with one quieter question.

"When it happens so fast," they said, "and you can't even feel the signal move — how do you know it's really in there?"

Flicker thought about the candle, and the flinch, and the elder's warm slow voice.

"You feel it *after*," they said. "That little jump — hand already pulled back, heart already going, breath already caught — before you've decided a thing. That leftover startle in your chest, that's the message that already came and went. You never catch it moving. You only ever catch it *landing*." They looked out at their glowing wall of threads. "It's the fastest, most faithful thing in you, and it never once asks for credit. It just keeps you safe and carries on."

The kid nodded slowly, and Flicker watched the slouch lift off their shoulders — the same way, years ago, their own had.

They didn't say the rest out loud, but they thought it, warm and glowing: *the part of you that moves before you can is not a stranger. It's the oldest friend you've got. It's been catching your mugs your whole life.*

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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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