TINY INNOVATORS: A Toolkit for Creating an ECE STEAM Makerspace

In support of joyful making and powerful learning for young children

A collaboration of innovative ECE STEAM experts facilitated by Beyond 100K ***July 2025***

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Please note: In the spirit of collaboration and innovation, our team used AI tools responsibly and transparently to enhance and refine this publication. Guided by ethical practices and human expertise, we leveraged AI to support clarity, creativity, and shared learning.

The Authors

The *ECE Makerspace Toolkit* was a collaborative effort organized by Beyond100K, bringing together a dynamic group of authors from diverse institutions committed to advancing early childhood STEM education. Contributors included representatives from the California State University Chancellor's Office, The League of Young Inventors, KID Museum, Carnegie Science Center, Fort Hays State University, and Science Friday. This cross-sector collaboration reflects a shared commitment to empowering early educators through innovative, equitable, and hands-on learning experiences.

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Introduction

The 'maker movement' leads to a new pedagogy - 'Tinkquiry' = Tinkering + Inquiry."

by Peter Skillen

Rationale

Tiny Innovators is a toolkit designed to support educators, families, and learning communities in establishing engaging, hands-on learning environments where young children can explore and experiment with STEAM—Science, Technology, Engineering, Arts, and Mathematics. This toolkit provides a comprehensive framework for cultivating an inquiry-based, child-centered space that encourages creativity, collaboration, and innovation for our youngest learners and makers.

At the core of an Early Childhood Education (ECE) STEAM Makerspace is a dynamic environment where children gather to build, tinker, design, and solve problems. These spaces emphasize active engagement and hands-on learning, providing young children with meaningful opportunities to explore real-world concepts through play and project-based experiences.

Makerspace is a collaborative environment where children share ideas, experiment with materials, and work together to explore, solve problems, and create. The focus is on process over product, encouraging open-ended activities that support both social interaction and cognitive development. Central to the experience is project-based learning, where children engage in hands-on, meaningful tasks that help them apply and

extend their understanding of STEAM concepts within developmentally appropriate, real-world contexts.

Makerspaces spark creativity and imagination. By providing open-ended materials and encouraging risk-taking, they empower children to pursue their ideas, try new approaches, and develop innovative solutions. These spaces also strengthen connections for shared learning among children, educators, families, and the community.

Ultimately, an ECE STEAM Makerspace is more than just a room—a mindset and a movement.

It cultivates curiosity, inspires a lifelong love of learning, and equips children with the critical thinking, collaboration, and problem-solving skills they will need to thrive in a complex and rapidly changing world.

An Early Childhood Education (ECE) STEAM Makerspace is a highly important setting for learning for several compelling reasons. First, it fosters holistic development in early learners ages three to eight. STEAM Makerspaces encourage children to explore, experiment, and solve problems. They learn to observe, analyze, and think critically

while engaging with various materials and challenges. For instance, building a tower with blocks helps children understand concepts of balance, stability, and spatial reasoning. Also, the open-ended nature of makerspaces allows children to express their ideas, innovate, and think outside the box. Activities like creating art with recycled materials or designing a new tool with LEGOs nurture their imagination and creative problem-solving skills. Additionally, makerspaces often involve collaboration, communication, and teamwork. Children learn to share ideas, negotiate, and work together to achieve a common goal. This fosters empathy, cooperation, and conflict resolution skills. For example, when building a group project, children learn to listen to each other's ideas and compromise on the design.

Second, makerspaces also aid in physical development, as many makerspace activities involve fine and gross motor skills. Manipulating small tools, building structures, or engaging in sensory explorations helps children develop hand-eye coordination and dexterity. Activities such as using scissors, connecting small blocks, or molding playdough contribute to fine motor skill development. In addition, makerspaces can often aid in the development of language and communication skills in children. While making, young learners naturally talk about their creations, ask questions, and explain their processes. This enhances their vocabulary, communication skills, and ability to articulate their thoughts. Discussing their projects with peers and educators helps them develop expressive language.

Finally, makerspaces cultivate foundational STEAM skills through play-based learning. Early exposure to STEAM concepts introduces young children to fundamental concepts in science (e.g., cause and effect, properties of materials), technology (e.g., using simple tools), engineering (e.g., design and construction), art (e.g., aesthetics, creativity), and mathematics (e.g., shapes, patterns, measurement) in an age-appropriate and hands-on manner.

Learning in a makerspace is fun, engaging, and relevant for young children. Children have fun while using inquiry-based learning to develop their problem-solving and critical thinking skills. Makerspace activities often present challenges that require children to

think critically and find solutions. Makerspaces naturally foster curiosity and encourage children to ask questions and investigate how things work, and they learn to test ideas, analyze what works and what doesn't, and iterate on their designs. This approach promotes a more profound understanding and a lifelong love for learning. For example, if a bridge they build keeps collapsing, they naturally want to continue, asking questions about its components and function, while learning to analyze the weak points and redesign it for better stability.

In summary, a STEAM Makerspace in an ECE setting provides a rich, stimulating environment where young children can learn, play, grow, and develop essential skills through hands-on exploration, creativity, and play. It lays a strong foundation for future learning and fosters a lifelong love for inquiry and innovation. Makerspaces provide opportunities for child-directed play and exploration, which allow children to follow their interests and learn at their own pace. This fosters a sense of agency and ownership in the child's learning at a young age.

An Early Childhood Education STEAM Makerspace is more than just a place to build—it's a place where young children come alive as thinkers, creators and collaborators.

Designed for learners ages three to eight, these spaces spark curiosity and invite children to explore the world through hands-on, playful learning. In a makerspace, children are encouraged to try things out, make mistakes, and try again. Whether stacking blocks to build a tower or using recycled materials to invent something new, they learn to observe, test ideas, and solve problems. These open-ended experiences

support critical thinking and creativity, helping children learn how to think, not just what to think.

Makerspaces also nurture social and emotional growth. As children work side by side sharing materials, exchanging ideas, and building together, they learn to communicate, collaborate, and resolve conflicts. Group projects become opportunities to listen to others, practice empathy and find common ground, building the foundations of lasting and transferable social skills.

Beyond intellectual and social-emotional aspects, learning is physical, too. Manipulating tools and materials builds fine and gross motor skills, from squeezing clay to cutting with scissors to connecting small blocks. At the same time, children build language skills as they talk about projects, ask questions, and describe what they're doing. These natural conversations help expand vocabulary and support self-expression. All the while, STEAM concepts are woven throughout the experience. Children encounter science when they explore cause and effect, technology when they use simple tools, engineering through design challenges, art through creative expression, and math through patterns, shapes, and measurement. It's all done in a way that feels like play—because it is. The true power behind a makerspace is centering children's interests and ideas. It gives them the freedom to follow their curiosity, take the lead in their own learning, and experience the satisfaction of figuring things out.

Audience

This toolkit is designed to support a wide range of individuals and organizations dedicated to nurturing the growth and development of young children—from ages 3-8 or Preschool - 3rd grade—through hands-on, inquiry-based STEAM learning. Whether housed in a classroom, school, library, museum, or other community setting, the early childhood makerspace invites educators, families, and community members to create rich, playful, and engaging environments that inspire curiosity and innovation.

The audience for this toolkit includes:

- Early childhood educators and PK–3 teachers looking to integrate STEAM into their classrooms using developmentally appropriate practices.

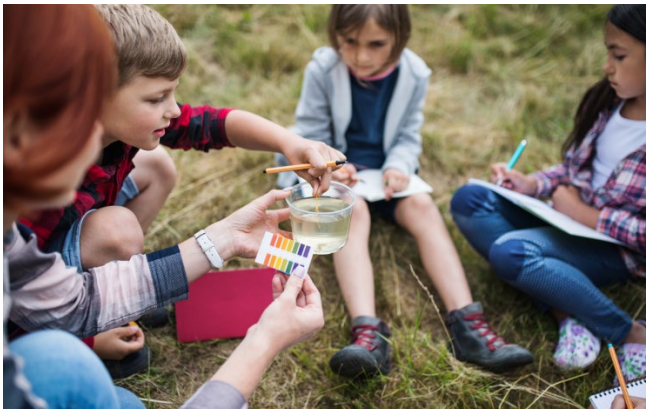
- School leaders and curriculum coordinators seeking to implement or expand hands-on learning environments that align with early child development principles.
- Librarians, museum educators, learning center coordinators, and community program facilitators who want to offer interactive STEAM experiences for young learners in public or informal learning spaces.
- Families and caregivers interested in supporting young children's exploration and creativity at home or in community-based makerspaces.
- Community partners and volunteers involved in early learning initiatives who wish to contribute to joyful, equitable, and inclusive STEAM opportunities.

Rooted in the principles of developmentally appropriate practice (DAP), the makerspace emphasizes using age-appropriate tools, materials, and approaches. It values open-ended exploration, joyful learning, and child-led discovery, fostering an environment where young children can engage with real-world concepts in meaningful and playful ways.

More than a physical space, makerspaces represent a learning philosophy—one that champions creativity, collaboration, and experimentation.

It is designed to spark curiosity, encourage problem-solving, and cultivate a lifelong love for inquiry and innovation in even the youngest learners.

Part One: Guiding Principles for an ECE STEAM Makerspace



Developmental Appropriateness

Activities and materials must be age-appropriate and aligned with children's developmental stages… in other words, child-centered. This principle is key to ensuring that learning experiences are engaging and effective. Activities matching a child's cognitive, emotional, social, and physical abilities are more likely to foster meaningful exploration, creativity, and skill development. For example, toddlers benefit from hands-on sensory play that builds fine motor skills and language. At the same time, older preschoolers can engage in problem-solving tasks that encourage critical thinking and collaboration. Age-appropriate materials also help prevent frustration from overly challenging tasks, or boredom from overly simplistic ones. By respecting developmental milestones, educators can create a supportive environment that nurtures confidence, curiosity, and a lifelong love of learning.

Activities and materials should align with children's developmental stages—put simply, they should be child-centered. This ensures learning experiences are engaging, supportive, and effective. An activity is considered developmentally appropriate when it meets children where they are—honoring their cognitive, social, emotional and physical abilities and offering just the right amount of challenge and support. In a STEAM makerspace, this means creating hands-on, playful experiences that feel accessible and engaging, while nurturing curiosity, creativity, and problem-solving.

When children can participate fully and meaningfully, they are more likely to take risks, explore new ideas, and build confidence in their learning ability.

What this Looks like in Practice:

Preschoolers (Ages 3-5)

Focus on sensory-rich materials, simple, open-ended activities, and cause-and-effect activities.

Examples: Water play with cups and funnels, textured building blocks, stacking and sorting tasks by color and shape.

Offer slightly more structured challenges that support creativity, language, and collaboration, alongside developing fine and gross motor skills.

Examples: Creating patterns with loose parts, building a home for a toy.

Kindergarten and Early Elementary (Ages 5-8)

Introduce multi-step tasks and problem-solving with room for iteration.

Examples: Creating a structure that can hold a weight, prototyping an invention using recycled materials.

Tips for Choosing Developmentally Appropriate Materials

- Use open-ended materials with no "right" answer, offering a variety of textures, shapes, and sizes to support sensory exploration and different grip styles.
- Avoid tasks requiring precise hand control unless you provide tools for young children. For example, using loop scissors that guide hand movement instead of standard scissors, or offering large screwdrivers and connectors instead of small or tightly fitted pieces. These adaptations help children build fine motor skills over time while reducing frustration.
- Include materials that invite multiple kinds of engagement (e.g. stacking, wrapping, tearing, pressing) so children can interact in ways that suit their developmental level and interest.
- Provide enough material variety and flexibility to support multiple developmental levels within the same activity.

Scaffolding Strategies

- Model without taking over-Demonstrate how a tool works, then step back.
- Use prompts that encourage thinking rather than directly answering questions:
- “What else could you try?”
- “What do you notice about how it moves?”
- “How could you make it stronger?”
- Adjust Complexity-For mixed groups, offer different entry points. Example: “Build something tall” (simpler) vs. “Build something tall that can hold an object without falling over” (more complex).
- Reflective Prompts for Educators

As you design activities and spaces, ask yourself the following questions:

- *What age-appropriate skills or concepts does this activity support?*
- *Can all children in my group meaningfully engage with this experience? What adaptations can I make to ensure that all children's needs are met?*
- *Are there tools, materials or supports I can add to better meet varied developmental needs?*
- *How might this activity foster confidence or independence in my students?*

Safety

Safety is paramount when designing and implementing activities for young children, as their well-being must always be the top priority. This means that all materials and tools provided should be non-toxic to prevent harm in case of accidental ingestion or skin contact. Additionally, items must be age-appropriate, avoiding small parts that pose choking hazards or sharp edges that could cause injury. Young children often explore with all their senses, including taste and touch, making it essential that every item they interact with is carefully vetted. Close supervision is equally critical—not only to ensure proper use of materials, but also to guide children through safe practices, reinforce positive behavior, and quickly intervene if risks arise. By prioritizing safety in both materials and through thoughtful adult oversight, educators and caregivers create a secure environment where children can explore, learn, and grow with confidence.

Young children learn best when they feel safe—both physically and emotionally. In a STEAM Makerspace, safety isn't just about avoiding harm; it's about creating an environment where children can take risks, explore tools and materials freely, and build confidence in their abilities.

Because young children explore and learn with their whole bodies, including their mouths and hands, it's essential to choose materials and tools carefully, and to stay present and observant during use. A safe makerspace is one where thoughtful setup, supervision and modeling go hand in hand.

What this Looks Like in Practice:

Preschoolers (Ages 3-5)

Use large, non-toxic materials with no small parts or choking hazards. Ensure the space is free of trip hazards and sharp edges.

Examples: Sensory bins with large or edible material (like rubber ducks or cooked pasta), jumbo building blocks, flour paste, and tempera paints.

Introduce slightly more complex tools with close supervision and clear modeling.

Examples: Safety scissors, tape dispensers, screw drivers, plastic cardboard saws and awls.

Kindergarten and Early Elementary (Ages 5-8)

With guided instruction, children can begin to use basic hand tools and explore more challenging materials.

Tips for Creating a Safe Makerspace

- Use non-toxic washable materials, check labels and know ingredients.
- Avoid small parts that could pose a choking hazard, especially with children under three.
- Choose tools with safety features and keep them in a designated area.
- Regularly inspect tools and materials for damage (splinters, broken parts etc.) and repair/remove.

- Store tools and materials at child-accessible levels only when they're safe to explore independently.

Supervision and Modeling Strategies

- Stay close and engaged. Active supervision means being within arm's reach and narrating safe behaviors as they happen.
- Model safe use of tools. Demonstrate, then invite children to try with your guidance. Explain how a tool works as well as how to use it.
- Set clear expectations. Use simple language that clearly communicates the behavior you expect (Scissors are for paper only, not hair) and repeat often.
- Teach cleanup as part of safety. Organizing tools and materials helps prevent accidents and builds responsibility.
- Keep a first aid kit and know how to use it. All makerspaces should keep a well-stocked first aid kit, be familiar with its contents, and know how to use it.

Reflective Prompts for Educators

As you design activities and spaces, ask yourself the following questions:

- Are all of the materials and tools in my space safe for the age group I am working with? What changes can I make to the way I store or teach these tools to improve safety in my space?
- Have I modeled, or do I have a plan to model how to use each tool or material safely?
- Am I close enough to step in quickly if needed?
- What is my plan for reinforcing safety without shutting down exploration?

Interdisciplinary

Embodying interdisciplinarity into an ECE STEAM Makerspace is crucial because it mirrors the interconnected nature of real-world problem-solving and learning. Young children naturally perceive the world holistically, integrating knowledge from science, technology, engineering, mathematics, arts, and language seamlessly into their daily experiences. An interdisciplinary approach capitalizes on this natural curiosity by breaking down artificial boundaries between subjects, allowing children to apply diverse

skills simultaneously, such as using mathematical thinking while constructing with blocks, employing creative storytelling during robotics projects, or exploring scientific concepts through art. By blending different disciplines, children develop a deeper understanding, critical thinking, and creativity, gaining a more authentic and comprehensive learning experience that prepares them effectively for future challenges. This integrated approach promotes meaningful engagement, fosters innovation, and supports the development of versatile problem-solving skills essential for lifelong learning.

What this Looks Like in Practice:

Preschoolers (Ages 3-5)

Young preschoolers are driven by sensory exploration and early symbolic thinking. They're beginning to connect language to actions, notice cause and effect, and experiment through repetition. Interdisciplinary experiences should emphasize exploration over outcome.

Examples: Mixing colors while painting with sponges (science and art) stacking cups and counting (math, motor, and language), creating images with natural objects (art, science, language) .

Preschoolers are increasingly able to plan, represent ideas symbolically, and work collaboratively. They enjoy imaginative play, categorizing, and beginning to explain their thinking. Interdisciplinary learning at this stage supports creative expression and early problem-solving.

Examples: Creating a city from blocks and telling stories about who lives there (engineering, art, and language), sorting natural materials by type and weight (science and math.

Kindergarten and Early Elementary (Ages 5-8)

Children in this range are capable of sustained attention, early planning and iteration, and beginning to apply reasoning to their ideas. They can articulate their process, take on design challenges, and explore abstract connections across disciplines.

Examples: Designing a creature that can survive in a specific habitat and writing a story about it (science, engineering, and writing).

Tips for Designing Interdisciplinary Activities

- Start with big questions or real-world scenarios that invite multiple ways of thinking (e.g., "How can we help our community?" or "What kind of home does a bird need?").
- Choose materials that invite cross-disciplinary play, such as blocks with story figures or art supplies with measuring tools.
- Allow space for language and storytelling within hands-on work—encouraging children to narrate, document, or reflect on their process.
- Use visual documentation (photos, drawings, charts) to highlight the overlap between subjects and show children how they are using multiple ways of thinking.

Facilitation Strategies

- Narrate connections aloud. "You're building a bridge—that's engineering—and you're measuring how long it is with cubes. That's math!"
- Offer open-ended prompts that support integration:
- "Can you tell a story about what you're building?"
- "What do you think will happen if…?"
- "How could we show that with color or movement?"
- Invite reflection: Ask children what they noticed, what surprised them, or what they'd do differently next time.

Reflective Prompts for Educators

As you design activities and spaces, ask yourself the following questions:

- Does this activity invite more than one way of thinking or expression?
- How might I layer in language, art, or math in a way that feels natural and meaningful?
- Am I highlighting the connections between disciplines when I talk with children?

- How can I adapt this activity to include more sensory, physical, or narrative elements?

Open-Endedness

Focusing on materials and activities encouraging open-ended exploration and creativity centers the young learner, allowing them to engage in authentic, self-directed learning experiences. Unlike tasks with fixed outcomes, open-ended activities allow children to experiment, make choices, and express their ideas uniquely. This kind of play fosters critical thinking, problem-solving, and imagination. For instance, providing loose parts like blocks, fabric, or recycled materials invites children to build, create, and invent in countless ways, producing something different based on their interests and curiosity. This approach supports cognitive and social-emotional growth, honors each child's individuality, and promotes a sense of agency in the learning process.

Open-ended materials and activities allow children to explore freely, make choices, and express themselves in ways that reflect their own ideas, interests, and experiences. Unlike tasks with fixed outcomes or step-by-step instructions, open-ended experiences center the child as the decision-maker and problem-solver, fostering creativity, critical thinking, and imagination.

In a STEAM Makerspace, open-endedness creates space for experimentation and discovery. Children can build, test, adapt, and transform their ideas without the pressure of getting it "right." Loose parts like blocks, fabric, or recycled materials invite infinite possibilities—what begins as a tower might become a spaceship, a puppet stage, or something entirely new.

This kind of play supports both cognitive and social-emotional development. It nurtures resilience, as children learn to try, fail, and try again; flexibility, as they adapt their thinking; and most importantly, agency—the understanding that their ideas matter, that they can make decisions, and that they have the power to shape the world around them.

Agency is essential in early childhood learning. When children are given real choices and the tools to pursue them, they become more confident, engaged, and motivated.

They learn to trust their instincts, persist through challenges, and express their unique perspectives—all foundational skills for lifelong learning and problem-solving.

What this Looks Like in Practice:

Preschoolers (Ages 3-5)

Open-ended materials should be safe, simple, and allow for repetition and variation.

Examples: Water play with cups, spoons, and funnels (math and sensory and fine motor): Children choose how to fill, pour, and transfer, exploring volume and gravity through trial and error. Fabric exploration stations (creative play + sensory + autonomy): Wrap, drape, and hide objects with various textures—expressing preferences and practicing control.

Preschoolers begin to engage in pretend play and symbolic representation. Open-ended materials support storytelling, experimentation, and collaborative construction.

Examples: Creating a city from blocks and telling stories about who lives there (engineering, art, and language), sorting natural materials by type and weight (science and math.

Kindergarten and Early Elementary (Ages 5-8)

Children in this range are capable of sustained attention, early planning and iteration, and beginning to apply reasoning to their ideas. They can articulate their process, take on design challenges, and explore abstract connections across disciplines.

Examples: Designing a creature that can survive in a specific habitat and writing a story about it (science, engineering, and writing).

Tips for Designing Open-Ended Activities

- Use invitations, not instructions (e.g., “Can you make something that moves?” rather than “Make a car.”).

- Provide loose parts—materials with multiple potential uses (e.g., cardboard, fabric, bottle caps, tubes).
- Ensure activities have no single 'right' answer or end product.
- Display and celebrate diverse outcomes to reinforce that every child's idea has value.

Facilitation Strategies

- Ask open-ended questions: "What do you notice?" "What else could you try?" "How is this different from your first idea?"
- Use language that encourages iteration, not perfection (e.g., "What would you change if you did it again?").
- Be a co-investigator: explore materials alongside children and model curiosity without taking over.

Reflective Prompts for Educators

- Are children making meaningful decisions about their process or product?
- Do the materials and prompts allow for multiple outcomes?
- How do I respond to uncertainty, messiness, or unexpected directions in children's work?
- What messages am I sending about failure, revision, and originality?

Play-Based Learning

The integration of making into play-based learning experiences enriches children's development by combining creativity, exploration, and hands-on problem-solving within a natural and enjoyable context. Play is how young children make sense of the world, and when maker activities, such as building, designing, or crafting, are embedded within play, they become powerful tools for learning. For example, a child constructing a pretend rocket ship from cardboard not only engages in imaginative play but also develops spatial awareness, fine motor skills, and early engineering concepts. This integration supports a holistic approach to learning, where cognitive, physical, and socio-emotional growths happen simultaneously. By allowing making to emerge

organically through play, educators foster curiosity, resilience, and a love of learning without separating it from the joy and freedom of childhood exploration.

Play is how young children make sense of the world—it's joyful, natural, and essential. When making is integrated into play, it becomes a powerful tool for exploration, creativity, and hands-on problem-solving. A child building a rocket ship from cardboard isn't just playing—they're developing spatial reasoning, fine motor skills, and early engineering concepts. In a STEAM Makerspace, this kind of play supports the whole child—cognitively, physically, and socially—while nurturing curiosity, resilience, and a love of learning. When making emerges organically through play, children are free to follow their ideas, take risks, and grow through the joyful process of discovery.

What this Looks Like in Practice:

Preschoolers (Ages 3-5)

Young preschoolers engage in exploratory and parallel play, often using simple props or real-world materials to act out everyday scenarios.

Examples: Pretending to cook with pots, spoons, and cardboard food (dramatic play and fine motor): Children mimic adult behaviors, build vocabulary, and experiment with materials through role-play.

Examples: Turning a box into a bus using crayons and paper plates (construction and imagination): A single object becomes a vehicle for movement, sound, and storytelling.

Examples: Using scarves, baskets, and fabric scraps in pretend play (sensory and symbolic thinking): Children create capes, nests, or blankets—transforming materials through narrative.

Older preschoolers engage in more elaborate pretend play and begin to design environments, characters, and props as part of their stories.

Examples: Building a rocket ship or animal habitat with cardboard and blocks (engineering and storytelling): Children narrate their adventures while constructing meaningful settings.

Examples: Creating a costume or puppet from fabric, string, and tape (art, design, and language): They design characters and perform stories, often with peers, supporting collaboration and creativity.

Examples: Setting up a "repair shop" or "store" with tools and labeled materials (math and symbolic play): Children sort, price, and "fix" objects, applying emerging numeracy and classification skills.

Kindergarten and Early Elementary (Ages 5–8)

Children combine elements of dramatic play, storytelling, and design to explore more structured challenges and share ideas with others.

Examples: Designing and building a small world or setting for a group story (literacy, spatial design, and collaboration): Children co-create characters and plot while planning and constructing the world in which it unfolds.

Examples: Creating a pretend museum, zoo, or library, complete with exhibits and signage (research, design, and social learning): Children invent roles, categorize collections, and practice explaining their thinking to others.

Examples: Role-playing as engineers, doctors, or inventors to solve a problem in character (science, empathy, and systems thinking): Children inhabit identities while making meaningful design decisions within a narrative.

Tips for Supporting Play-Based Making

- Integrate dramatic play and storytelling props into your makerspace—costumes, puppets, animal figures, tools.
- Offer open-ended prompts that spark imaginative contexts (e.g., "What will your creature need to survive?" or "What is your rocket's mission?").
- Make time and space for process-focused play, allowing children to return to stories and creations over several days.
- Facilitation Strategies
- Join the play without leading it—mirror children's ideas, expand language, and introduce new materials naturally.

- Ask narrative-supporting questions: “What happens next?” “Who helps you?” “Where are you going?”
- Help children document their play through drawings, photos, or dictation to revisit and build on ideas.

Reflective Prompts for Educators

- Are children able to drive the direction of their play and making?
- How do I value play as a meaningful form of learning in my environment?
- How can I extend children’s play into deeper design or storytelling challenges without disrupting their flow?
- What messages am I sending about play’s role in learning—and who it’s for?

Sensory Exploration

An ideal practice is to include multiple opportunities for sensory exploration with various textures, materials, colors, and tools; it is essential for supporting young children’s cognitive, physical, and emotional development. Sensory play—such as touching soft fabric, squishing clay, or exploring the sound of sandpaper—stimulates the brain, helping children build neural connections related to language, motor skills, and problem-solving. Engaging multiple senses also supports self-regulation and can have calming effects, especially for children who may struggle with attention or emotional expression. By offering a variety of materials like sand, water, dough, or natural objects, and tools such as scoops, brushes, or tongs, educators create rich, hands-on learning experiences that encourage curiosity, experimentation, and discovery. Sensory exploration also fosters creativity, as children combine different textures and materials in imaginative ways, deepening their understanding of the world around them.

Providing opportunities for sensory exploration is essential to supporting young children’s cognitive, physical, and emotional development. When children engage their senses—through touch, sound, smell, sight, and movement—they activate and strengthen the neural pathways that support language development, motor coordination, and problem-solving. Sensory play also fosters self-regulation and can

offer calming, grounding experiences for children who may struggle with attention, transitions, or emotional expression.

In a STEAM Makerspace, sensory materials are not just add-ons—they are core tools for inquiry, experimentation, and creativity. Activities like squishing clay, exploring the sound of sandpaper, or mixing natural materials allow children to experience cause and effect, test ideas, and build understanding through hands-on discovery. Sensory exploration also invites children to combine textures and tools in new ways, deepening their ability to observe, compare, and create meaning from the world around them.

What this Looks Like in Practice:

Preschoolers (Ages 3-5)

Younger preschoolers use their senses to explore and understand their environment. Sensory materials should be safe to mouth, manipulate, and repeat actions with.

Examples: Squishing, rolling, and poking soft dough or clay (fine motor and tactile exploration): Children strengthen hand muscles and explore pressure, shape, and resistance.

Examples: Feeling and sorting fabric scraps of different textures (language and classification): Children begin naming sensations like soft, rough, or fuzzy.

Examples: Exploring water with cups, funnels, and ladles (cause and effect and motor planning): Pouring and splashing supports coordination and spatial awareness.

Intentional exploration, comparing materials and describing differences.

Examples: Mixing natural materials like sand, pebbles, and water to observe changes (science and sensory integration): Children experiment with texture and transformation.

Examples: Using brushes, rollers, and fingers to paint on different surfaces (art, sensory, and tool use): Children explore motion and texture while expressing ideas through color and movement.

Examples: Exploring scent jars, spices, or herb clippings (smell and memory): Children make connections between sensory input and past experiences, building descriptive language.

Kindergarten and Early Elementary (Ages 5–8)

Children can use sensory experiences to support planning, testing, and reflecting as part of more complex tasks.

Examples: Creating a sensory sculpture using mixed materials (art and texture-based design): Children combine feathers, foil, paper, and dough to build something expressive.

Examples: Comparing materials using touch or sound and charting results (observation and data collection): Children classify smooth vs. rough, soft vs. hard, or loud vs. quiet.

Examples: Designing a tool to move or manipulate a tricky material (engineering and problem-solving): Children test tongs, scoops, or custom tools to interact with rice, beans, or gel beads.

Tips for Supporting Sensory Exploration

- Provide a wide variety of textures, weights, temperatures, and materials—such as sand, dough, water, clay, leaves, or fabric.
- Include tools that support different kinds of motion: squeezing, scooping, pouring, twisting, brushing, or stamping.
- Rotate materials regularly to renew interest and expand exploration.
- Set up spaces that allow for mess and experimentation, with clear routines for cleanup and transitions.

Facilitation Strategies

- Use descriptive language to model vocabulary: “This one feels bumpy,” “That’s very stretchy,” “I hear a crunch.”
- Encourage comparison and reflection: “How does this feel different from the last one you tried?”
- Watch for sensory preferences and sensitivities and offer choice—some children may seek strong input, while others avoid certain sensations.
- Create quiet sensory areas for children who need calming or focus.

Reflective Prompts for Educators

- Have I included opportunities for sensory input across multiple senses today?
- Do my materials offer both comfort and challenge to different sensory needs?
- How do I use sensory experiences to spark conversation and reflection?
- What patterns do I notice in how individual children engage with sensory play?

Inclusiveness

Creating an inclusive ECE STEAM Makerspace ensures that every child feels valued, respected, and empowered to participate fully regardless of ability, background, or learning style. An inclusive makerspace removes barriers by offering diverse materials, accessible tools, and flexible activities that accommodate different developmental needs and cultural experiences. This creates an environment where all children can engage in hands-on exploration, express creativity, and build confidence through meaningful participation. Inclusion also enriches the learning experience for everyone by fostering empathy, collaboration, and appreciation for diverse perspectives. By intentionally designing an inclusive STEAM Makerspace, educators send a powerful message that innovation and problem-solving are for everyone, laying the foundation for equitable learning and lifelong curiosity in all children.

Creating an inclusive ECE STEAM Makerspace ensures that every child—regardless of ability, background, language, or learning style—feels valued, respected, and empowered to participate fully. Inclusion is not just about access; it’s about belonging. When

educators design with intention, they remove barriers and create opportunities for every child to explore, create, and contribute meaningfully.

Inclusive makerspaces offer diverse materials, accessible tools, and flexible activity structures that support a range of developmental needs and cultural experiences. This allows each child to bring their full self into the space and to be seen as capable, creative, and essential to the community. Inclusive environments also benefit all children by encouraging empathy, collaboration, and appreciation for different ways of thinking and doing. When inclusion is built into the foundation of the space, educators send a clear and powerful message: innovation and problem-solving are for everyone.

What this Looks Like in Practice:

Preschoolers (Ages 3-5)

Inclusion at this age means ensuring that all children can access materials and participate in safe and supportive ways.

Examples: Offering a range of material sizes and types to support varied fine and gross motor abilities (e.g., large blocks, soft fabric, easy-grip tools).

Examples: Providing quiet nooks or calm spaces for children who need breaks from stimulation.

Examples: Using visual cues and gestures alongside language to support emerging communication and multilingual learners.

Preschoolers benefit from multiple ways to engage, communicate, and collaborate.

Examples: Inviting children to express ideas through drawing, building, movement, or storytelling—valuing all forms of expression.

Examples: Pairing children intentionally to encourage peer modeling and support.

Examples: Offering tools with adaptive grips or modified cutting edges for children with different motor needs.

Kindergarten and Early Elementary (Ages 5–8)

Older children can begin to reflect on inclusion themselves and engage in group work with differentiated roles.

Examples: Designing challenges with flexible entry points so children can choose how they contribute (e.g., builder, planner, artist, recorder).

Examples: Providing materials that reflect diverse cultures, abilities, and identities through books, visuals, and storytelling prompts.

Examples: Encouraging children to co-create agreements for how to work together and respect each other's ideas.

Tips for Supporting Inclusion

- Provide multiple ways for children to engage—through movement, language, design, and play.
- Use visual schedules, gesture cues, and modeling to support varied communication styles.
- Choose materials that reflect and affirm the identities and experiences of the children in your space.
- Design flexible groupings and roles that allow every child to contribute meaningfully.

Facilitation Strategies

- Use strength-based language: "I see how carefully you placed that," "You had a great idea for how to try it a different way."
- Model inclusive behavior: invite quieter voices in, validate different approaches, and reflect back diverse thinking.
- Offer choices in how to participate and make space for varied pacing, sensory needs, and communication styles.
- Observe patterns of participation and adjust grouping, prompts, or materials to increase engagement for every child.

Reflective Prompts for Educators

- Who is fully engaged—and who isn't? Why might that be?
- How do I ensure every child feels seen, heard, and capable in this space?
- Are my materials and prompts representative of the children in my group?
- How do I adapt activities to meet a wide range of needs without singling anyone out?

Collaboration and Social Interaction

Designing the space and activities that encourage and enhance collaboration, and communication helps children develop essential social skills such as sharing, problem-solving, negotiation, teamwork, and empathy. When the environment is intentionally arranged with shared workspaces, group materials, and activities that require teamwork like building structures together, co-creating art, or role-playing in dramatic play areas, children naturally engage with one another, exchanging ideas and working toward common goals. These interactions support language development and help children learn to listen, take turns, and respectfully express their thoughts. Creating inviting, flexible spaces with open-ended materials encourages dialogue and cooperation, as children are motivated to brainstorm, experiment, and solve challenges together. By fostering a collaborative atmosphere, educators nurture a sense of community and belonging that enriches learning and personal growth.

Collaboration and communication are the core components of a STEAM Makerspace. When young children work together—building, planning, negotiating, and sharing ideas—they develop essential social-emotional and language skills. These include turn-taking, listening, expressing opinions respectfully, navigating conflict, and working toward shared goals.

Designing environments and activities that support collaboration helps children learn not just how to make something, but how to make something together. Shared workspaces, open-ended group materials, and flexible roles create natural opportunities for teamwork. Through these experiences, children build empathy, develop confidence in social settings, and begin to understand the power of collective problem-solving. A

collaborative makerspace is also a more joyful one—where ideas spark between peers and a sense of community grows alongside creative projects.

What this Looks Like in Practice:

Preschoolers (Ages 3-5)

Collaboration begins with side-by-side play and simple social exchanges.

Examples: Setting up shared sensory bins or building areas where children can observe and imitate each other's actions.

Examples: Providing multiples of the same tools or materials to reduce conflict and support early sharing.

Examples: Narrating peer interactions ("You're both putting blocks in the bucket!") to model awareness and connection.

Preschoolers begin to engage in cooperative play and learn to express preferences and ideas.

Examples: Designing activities that require two or more children to complete a task, such as building a bridge or creating a mural.

Examples: Offering roles during group play or projects (e.g., designer, builder, decorator) to support turn-taking and interdependence.

Examples: Using story-based provocations or role-play scenarios to encourage collaboration and problem-solving.

Kindergarten and Early Elementary (Ages 5–8)

Children develop greater capacity for group planning, compromise, and long-term projects.

Examples: Facilitating team-based design challenges with shared goals and flexible outcomes.

Examples: Encouraging group decision-making and reflection ("How did your team decide what to build?").

Examples: Supporting peer feedback and revision processes that build respectful communication and collective thinking.

Tips for Supporting Collaboration

- Arrange the space with large, shared tables and group-accessible materials.
- Use activities that require multiple hands or perspectives to succeed.
- Offer provocations that are too big or too open-ended for one child to complete alone.
- Support flexible roles so children can contribute according to their strengths and comfort levels.

Facilitation Strategies

- Model collaborative language: "Let's figure this out together," "What's your idea?" "How can we help?"
- Encourage perspective-taking: "How do you think your partner felt when…?"
- Acknowledge and narrate positive collaboration moments: "You figured out how to share the tape—that's teamwork!"
- Support conflict as a learning moment, guiding children through negotiation, apology, and repair.

Reflective Prompts for Educators

- How often are children invited to collaborate—and in what ways?
- Are there opportunities for both leadership and active listening in group work?
- What kinds of materials or arrangements foster the most interaction in my space?
- How do I support children who may be reluctant to engage with peers?

Culturally Responsive

A culturally responsive STEAM Makerspace creates an environment where all children feel seen, respected, and connected—where their cultures, languages, and communities are not just acknowledged, but celebrated and woven into the learning experience. It affirms the diverse identities and experiences that children bring with them and invites them to build on those foundations through exploration and creation.

In early childhood, cultural responsiveness can take many forms: incorporating familiar materials into play, inviting families to share their stories, or designing activities that reflect a variety of perspectives and lived experiences. It also means recognizing that innovation, problem-solving, and creativity look different across cultures—and making space for multiple ways of thinking, building, and expressing ideas.

When STEAM learning is culturally responsive, children see that their ideas matter and that their unique ways of seeing the world are a strength—not something to set aside. This deepens engagement, strengthens relationships, and supports identity development. In doing so, educators cultivate equity, belonging, and a lifelong sense of possibility.

What this Looks Like in Practice:

Preschoolers (Ages 3-5)

For very young children, culturally responsive practice is grounded in familiarity, trust, and sensory engagement.

Examples: Including materials that reflect children's home lives (e.g., family photos, familiar foods in play kitchens, clothing from home cultures).

Examples: Using key words or songs from children's home languages during group time or transitions.

Examples: Providing play items that reflect different types of homes, tools, and family structures.

Preschoolers are developing a sense of self and noticing similarities and differences.

Examples: Offering open-ended materials that invite children to create characters, settings, or structures from their lived experience.

Examples: Incorporating books, music, and storytelling traditions from families in the classroom community.

Examples: Encouraging children to share stories or creations related to their family, traditions, or favorite activities.

Kindergarten and Early Elementary (Ages 5–8)
Children are ready to engage in deeper conversations about identity, perspective, and justice.

Examples: Designing challenges that invite children to solve real-world problems that matter to them and their communities.

Examples: Using prompts like "What's something from your culture you could teach others?" or "What do you want people to know about where you come from?"

Examples: Showcasing innovations and inventions from around the world to expand definitions of creativity and genius.

Tips for Supporting Culturally Responsive Practice

- Get to know children's families and communities—and use that knowledge to inform your choices of materials and prompts.
- Choose books, visuals, and role-play items that reflect a wide range of skin tones, languages, traditions, and histories.
- Avoid tokenism by embedding cultural diversity throughout the year, not just during heritage months or special occasions.
- Validate all ways of knowing and making—not just those aligned with dominant cultural norms.

Facilitation Strategies

- Invite children to teach or explain things that are important to them ("Tell us about that holiday," "How does your family do that at home?").
- Use inclusive language and storytelling that reflects multiple perspectives.
- Listen for cultural connections in children's play and build on them with materials or follow-up questions.
- Partner with families as co-creators of the learning space—ask what they'd like to share or see represented.

Reflective Prompts for Educators

- Whose stories, traditions, and experiences are reflected in this space—and whose are missing?
- How am I inviting families and communities into our making and learning experiences?
- Do the tools, images, and materials I offer reinforce a single narrative or make space for many?
- How do I help children feel proud of themselves and curious about others?

Sustainability

Makerspaces naturally provide ample opportunities to model sustainability and environmental consciousness. Many makerspace projects rely on reusing materials or "upcycling" items from the trash bin. Even with young children, you can foster sustainable design principles by asking young makers to think about their invention's full lifecycle from selecting materials to how items may be repurposed later. Concepts like waste reduction can be easily demonstrated in developmentally appropriate ways. In addition, with careful project selection, you can allow makers to address big, real-world challenges in empowering ways that inspire optimism in the face of challenges, building problem-solving skills along the way.

STEAM Makerspaces are natural environments for introducing young children to sustainability. When children reuse materials, care for shared tools, and find creative ways to reduce waste, they begin to see themselves as stewards of their environment and active participants in building a better future.

Even at the earliest ages, children can explore sustainability through hands-on, age-appropriate experiences: choosing between materials, sorting recyclables, or deciding how to reuse something they've made. These actions build habits of care, resourcefulness, and critical thinking. With thoughtful facilitation, educators can also guide young makers to consider a project's full life cycle—from material selection to how something might be used again in the future.

When children engage with real-world problems like protecting the planet or reducing waste, it helps them develop both practical skills and a hopeful mindset. They learn that they can make a difference—and that their creativity has purpose beyond the project at hand.

What this Looks Like in Practice:

Preschoolers (Ages 3-5)

Sustainability for young preschool children centers on exposure to natural materials and developing care for the environment.

Example: Using natural and reusable materials such as pinecones, fabric scraps, and wood blocks.

Examples: Sorting objects into reuse bins (e.g., paper vs. plastic) with adult modeling and language.

Examples: Practicing care for tools and materials—helping return items to bins or shelves.

Older preschoolers begin to make simple choices that support sustainable thinking.

Example: Designing with reused materials and talking about where they came from ("This box used to hold cereal. Now it's a boat!").

Example: Exploring concepts like "use it again" and "make less trash" through stories and making challenges.

Example: Caring for a classroom plant or compost bin to connect environmental responsibility to daily routines.

Kindergarten and Early Elementary (Ages 5–8)

Children at this stage can engage more deeply with environmental topics and problem-solving.

Example: Investigating the environmental impact of materials and choosing options that are reused, recyclable, or biodegradable.

Example: Designing something that solves a local environmental challenge (e.g., “How could we reduce waste in our lunchroom?”).

Example: Creating inventions that use only reused or natural materials and reflecting on how they might be repurposed.

Tips for Supporting Sustainability

- Stock your makerspace with reused, recycled, and natural materials and invite children to contribute from home.
- Choose prompts that highlight reuse, care, and impact (e.g., “Make something useful from something used”).
- Create visual systems for sorting and storing reused materials that are accessible to children.
- Talk openly about where materials come from and what happens when they are thrown away.

Facilitation Strategies

- Use language that frames sustainability as care: “Let’s take care of our tools,” “Can we use this again instead of throwing it away?”
- Model curiosity about materials: “Where do you think this came from? What else could it become?”
- Highlight children's choices that reduce waste or extend use, reinforcing sustainable thinking.
- Encourage reflection: “What will happen to your project after today?”

Reflective Prompts for Educators

- What messages am I sending about waste, value, and care through the materials I offer?
- Do children have the chance to make choices about what materials they use—and reuse?
- How do I help children connect small, everyday actions to larger environmental ideas?

- In what ways can I highlight sustainability without making it feel abstract or overwhelming?

PART TWO: Planning for the ECE STEAM Makerspace

Phase I: Define Goals and Objectives

Assessing needs and goals is a crucial first step in planning a successful makerspace, whether for an early childhood setting, a school, a library, or any other community. A well-defined understanding of the target audience and desired outcomes will guide space design, equipment, programming, and staffing decisions. Here's a comprehensive approach to assessing needs and goals:

Assess Needs and Goals

- What is the overall vision for the makerspace? What do you hope to achieve in the long term? (e.g., fostering creativity, developing problem-solving skills, promoting STEAM literacy, building community).
- What are the specific learning goals for the participants? What skills, knowledge, or attitudes do you want them to develop through their engagement with the makerspace? (e.g., learning to use specific tools, understanding basic coding concepts, developing collaborative skills).
- What are the programmatic goals for the makerspace? What types of activities, workshops, or events do you envision offering?

- What are the operational goals for the makerspace? How will the space be managed, staffed, and sustained?
- How will the success of the makerspace be measured? What indicators will you use to determine if the goals are being met? (e.g., participation rates, project outcomes, user feedback, skill development assessments).

Methods for Goal Setting:

- *Collaborative Brainstorming Sessions*: To ensure an inclusive space, gather stakeholders (educators, administrators, families/guardians of potential users) to brainstorm potential goals and objectives.
- *Reviewing Best Practices:* Research successful makerspaces in similar settings to identify effective models and goals.
- *Aligning with Existing Curricula or Frameworks:* Ensure the makerspace goals align with relevant educational standards or institutional priorities.
- *Using the SMART Framework:* Ensure goals are Specific, Measurable, Achievable, Relevant, and Time-bound.
- *Prioritization:* Not all goals are equally important or achievable in the initial stages. Prioritize based on the identified needs and available resources.

Phase II: Identify the Target Audience and Characteristics

- Who is the primary audience? Be specific. Consider age range, developmental stages, interests, prior experiences with making, and any unique needs or challenges.
- What are their current skills and knowledge? What are their areas of interest or curiosity? What developmental skills are they lacking that the makerspace could address?
- Consider specific needs for your specific early childhood audience (e.g., accessibility requirements, cultural relevance, language barriers, specific learning disabilities).

- Data collection may be done via surveys, questionnaires, interviews, focus groups, community listening sessions, observations, informal conversations, and review of current data.

Phase III: Analyze Resources and Constraints

- What is the available space? Consider size, layout, natural light, access to utilities (electricity, water), and potential for noise and mess.
- What is the budget? Determine the financial resources available for initial setup (equipment, furniture, materials) and ongoing operational costs (supplies, staffing, maintenance).
- What existing equipment and materials are already available? Can any existing resources be repurposed or integrated into the makerspace?
- What are the staffing resources? Who will manage and facilitate the makerspace? What are their skills and expertise? Will volunteers be involved?
- What are the safety considerations? Identify potential hazards and plan for appropriate safety measures and training.
- What are the time constraints for planning and implementation?

Phase IV: Synthesize Findings and Develop a Plan

- Analyze the data collected from the needs assessment. Identify key themes, common interests, and unmet needs.
- Connect the identified needs with the defined goals. Ensure that the goals directly address the needs of the target audience.
- Align with the curriculum and learning outcomes.
- Consider the available resources and constraints. Develop a realistic plan that aligns with the budget, space, and staffing limitations.
- Prioritize activities and equipment based on the identified needs and goals. Focus on high-impact activities that are feasible with the available resources.
- Develop a preliminary design for the makerspace layout. Consider workflow, storage, safety, and accessibility.

- Consider the makerspace in the context of your community. Does the preliminary design meet the needs and goals identified in Phase II?
- Outline potential programming and activities. Consider a range of options to cater to different interests and skill levels.
- Develop a plan for ongoing evaluation and feedback. How will you assess if the makerspace is meeting its goals and the needs of its users?
- Secure Stakeholder Support
- Securing stakeholder support is paramount to ensure the successful planning and implementation of ECE STEAM Makerspaces. Stakeholders include anyone who has an interest in or can influence the project, including your target audience. This includes educators, administrators, parents, and community members. Suggestions for gaining stakeholder support are found below:

Identify Your Stakeholders

List all individuals, groups, or organizations that might be affected by (e.g. target audience) or have an impact on Makerspace.

- *ECE educators*: They will be the primary facilitators of space.
- *Children:* While not direct decision-makers, understanding their interests is crucial as they are the primary users of the space.
- *School/Center administrators:* They control resources, approve initiatives, and influence policy.
- *Parents and/or Guardians:* They care about their child(ren)'s learning and development.
- *Support Staff:* Librarians, specialists, and aides may be involved.
- Community Members: Local businesses, organizations, or individuals with relevant expertise.
- *Potential funders:* Grant providers, philanthropic organizations and foundations, parent associations, and donors.

Understand and Consider Stakeholder Perspectives and Needs

- Empathy is Key: Put yourself in their shoes. What are their priorities, concerns, and potential benefits they see (or don't see) in a makerspace?
- Tailor Your Approach: Different stakeholders will have different motivations and concerns. Customize your communication to resonate with each group.

Communicate a Clear and Compelling Vision

What is the “Why"? Articulate the purpose and goals of the makerspace in a way that is easy to understand and exciting. Focus on the positive impact on children's learning and development. Use charts, tables, visuals, and other graphics. Share some successful ECE makerspaces, show potential layouts, and even involve children in creating drawings or models of their ideas. Do not forget to highlight the benefits by clearly explaining how the makerspace will benefit each stakeholder group. A non-exhaustive list is below:

- *Children:* Hands-on learning, opportunities for creativity and exploration, development of problem-solving skills.
- *Teachers:* Enhanced engagement, innovative teaching opportunities, alignment with curriculum goals.
- *Administrators:* Improved student outcomes, positive school image, potential for grants and community partnerships.
- *Parents:* Development of crucial 21st-century skills, increased engagement in learning, fun and enriching experiences for their children.
- *Community:* Potential for outreach programs, showcasing the center's innovation, fostering future talent.

Engage Stakeholders in the Planning Process

- Seek input early and just don't present a finished plan. Involve stakeholders from the beginning to gather their ideas, concerns, and suggestions. This fosters a sense of ownership and collaboration.
- Use surveys and questionnaires to gather broad feedback on needs, interests, and potential activities.

- Hold individual or group meetings to discuss the vision, address concerns, and answer questions.
- Facilitate interactive sessions where stakeholders can contribute ideas for the space, activities, and resources.
- Facilitate small-scale pilot maker activities to showcase the potential and gather feedback.

Addressing Concerns and Mitigating Risks

- *Anticipate Objections:* Think about potential concerns stakeholders might have (e.g., cost, safety, mess, curriculum integration) and prepare thoughtful responses.
- *Provide Solutions:* Demonstrate that you've considered these concerns and have strategies to address them (e.g., phased implementation, safety protocols, clear guidelines for material use, curriculum alignment strategies).
- *Be Transparent:* Share information openly about the planning process, budget, and potential challenges.
- Build Relationships and Foster Trust
- *Be a Good Listener:* Actively listen to stakeholders' feedback and show that their opinions are valued.
- *Communicate Regularly:* Keep stakeholders informed about the progress of the planning process.
- Be Enthusiastic and Passionate: Your genuine excitement for the project can be contagious.
- *Highlight Successes:* As the makerspace develops, share stories and examples of positive impact.

Tailor Your Message to Each Stakeholder Group

By proactively engaging stakeholders, understanding their needs, and communicating a clear and compelling vision, you can build strong support for your ECE STEAM Makerspace and ensure its long-term success. Remember that building trust and fostering collaboration are key to securing buy-in from all involved parties.

- *Educators:* Focus on pedagogical benefits, curriculum links, and professional development opportunities. For teachers, consider mentioning professional development workshops on maker-centered learning, curriculum mapping sessions, opportunities to co-design activities. While for administrators, give presentations highlighting the alignment with strategic school goals, the potential for grants and funding, and the data on positive impacts of makerspaces for the school and in other ECE settings.
- *Parents:* Highlight the development of essential skills, engagement in learning, and fun, enriching experiences for their children. Address any concerns about safety or cost. Plan on explaining the benefits of STEAM and maker education through information sessions, family maker nights, newsletters showcasing children's projects, and social media.
- *Community Members:* Focus on potential for partnerships, community outreach, and contribution to local innovation.

Select a Location

Selecting the correct location for an ECE STEAM Makerspace is a foundational step that significantly influences its effectiveness, accessibility, and overall impact. The ideal space should be safe, spacious, and flexible, allowing for various hands-on, often messy activities involving movement, collaboration, and creativity. It should be easily accessible to all children, including those with mobility or sensory needs, and situated in a part of the learning environment where supervision is easy and distractions are minimized. Natural light, ventilation, and noise levels should also be considered to ensure a comfortable and stimulating atmosphere. Proximity to storage areas, sinks, and electrical outlets is essential for practical functionality. Do you have indoor or outdoor options? Remember that the location needs to be safe and accessible. Ultimately, the area should support a sense of curiosity and exploration, inviting children to engage, create, and discover in a space that feels both welcoming and inspiring.

Plan the Budget and Funding Sources

Planning for budget and funds in creating an ECE STEAM Makerspace requires a thoughtful and strategic approach to ensure the space is well-equipped, sustainable,

and aligned with educational goals. Start by identifying core needs such as essential tools, age-appropriate materials, furniture, storage solutions, and safety features. Prioritize purchases that offer versatility and long-term use, such as reusable building sets, open-ended materials, and durable equipment. It's also important to allocate funds for ongoing replenishment of consumables like tape, glue, or paper. Be reminded that you need to allocate storage spaces. Will this be an extra cost? Furthermore, assure that expenditures that involve training and professional learning must also be included. And as always, basic overhead expenses like utilities, communication lines, internet, liabilities, etc. must be factored in also.

Continued explorations of diverse funding sources—such as foundations, school budgets, grants, donations, community partnerships, or other school/community associations—can help supplement limited resources. Involve families and local businesses through sponsorships, fundraising efforts, or supply drives to build community support. A clear, itemized budget paired with a compelling vision for the makerspace can strengthen funding proposals and ensure responsible, transparent use of resources.

PART THREE: Creating the Learning Environment

This comprehensive toolkit provides educators with strategies for thoughtfully designing a makerspace that nurtures young children's curiosity, creativity, and capacity for complex thinking.

Drawing on Reggio Emilia-inspired principles, the toolkit highlights the importance of the learning environment as the "third teacher," emphasizing the functionality and emotional and aesthetic quality with accessibility and intentionality in every aspect of the space (Gandini, 2012).

Each element from the color palette to the arrangement of furniture and materials is intentionally curated to inspire wonder, provoke inquiry, and support sustained engagement. Educators are guided in creating a beautiful, meaningful, and responsive environment to young learners' developmental needs and interests. The space becomes a living studio where children are empowered to tinker, build, create, investigate, and engage in collaborative discovery.

Educators are guided to create an environment that is beautiful, meaningful, and responsive to young learners' developmental needs and interests. The makerspace becomes a living studio where children are empowered to tinker, build, create, investigate, and collaborate.

Environment and Setup

An ECE STEAM Makerspace should be warm, welcoming, and alive with possibilities. The setup should communicate that children's ideas matter and that their work is valued. Thoughtful environmental design fosters a sense of belonging and ownership. Sensory elements such as natural light, calming colors, plants, textures, and ambient sounds contribute to an atmosphere that supports concentration, joy, and imagination. The physical environment should invite children to explore independently, engage in sustained investigations, and revisit ideas over time.

Layout Considerations

When designing the spatial flow of the makerspace, prioritize openness, flexibility, and visual access. Arrange furniture and work zones to promote autonomy, ensure adult supervision, and minimize bottlenecks. Children should be able to move freely, choose where and how to engage, and easily transition between activities. Include cozy nooks for quiet work, larger tables for collaborative projects, and clear pathways that support mobility and safety. Consider how the layout supports both short bursts of activity and long-term projects that can evolve over multiple days or weeks.

Features to include:

- Soft rugs or mats to define areas and reduce noise.
- Clear line-of-sight for educators to observe and support children's work.
- Flexible workspaces that can be reconfigured for different purposes or group sizes.
- Flow and visibility are prioritized, allowing children to move freely and safely between and among zones.
- Natural lighting, plants, and neutral tones create a calm and beautiful atmosphere.

Defined Zones

A well-organized makerspace includes clearly defined areas that invite different kinds of play, exploration, and creation. Each zone supports a particular mode of thinking and expression, while encouraging children to integrate ideas across domains.

Building Zone

This area includes a range of open-ended construction materials, such as unit blocks, natural elements (twigs, stones, pinecones), ramps, and magnetic tiles. It supports spatial reasoning, engineering concepts, and physical coordination.

Art Zone

It features materials for creative expression and sensory exploration: easels, washable paints, markers, recycled collage items, clay, paper, and glue. It encourages storytelling, symbolic thinking, and aesthetic awareness.

Technology Zone

Integrates age-appropriate tools that promote logical thinking and digital literacy: Bee-Bots, simple coding cards, tablets with open-ended apps like drawing or stop-motion animation, and light tables with translucent manipulatives.

Science Zone

Encourages inquiry-based discovery with tools such as magnifying glasses, measurement scales, sensory bins, collections of leaves or rocks, magnets, and simple experiment kits. Facilitates observation, classification, and cause-and-effect reasoning.

Exploration / Loose Parts Zone

Open trays and baskets of found and natural objects like corks, shells, bottle caps, buttons, beads, fabric scraps, and wood offcuts allow for imaginative play and inventive construction. This area supports divergent thinking and material fluency.

Furniture

Choose flexible furnishings that support both individual and group work. Furniture should encourage independence, be easy to clean, and support a variety of learning styles and physical needs.

Select:

- Low tables and adjustable-height seating for comfort and ergonomic support.
- Floor cushions and cozy seating areas for informal exploration or reflection.
- Mobile dividers and light shelving units that can adapt to the changing needs of children and projects.
- Standing workstations for large-scale construction or active building tasks.

Safety and Accessibility

The makerspace should be an inclusive and safe space for every child. Design the environment so all learners feel secure, confident, and capable of navigating and using materials without excessive adult intervention.

Key considerations:

- All materials and furniture should be age-appropriate and child-safe.
- Tools should be stored within children's reach but supervised during use.
- Emergency procedures and safety expectations should be clearly communicated and practiced.

Age-Appropriate Tools and Materials

Provide real tools that are adapted for small hands and emerging motor skills. Offer opportunities to learn tool safety habits and develop practical, lifelong skills. Suggested tools include:

- Safety scissors, hole punchers, and cardboard cutters
- Hand drills, screwdrivers, and hammers with soft grips
- Low-heat glue guns (with close adult supervision) and non-toxic adhesives
- Child-safe paints and other sensory materials

Inclusive Design

Creating an inclusive makerspace ensures that all children—regardless of ability, learning style, or background—can access, participate in, and benefit from the environment.

- *Wide Pathways*: Ensure all pathways between stations are at least 36 inches wide to accommodate mobility devices and group movement. Avoid clutter that could restrict access.
- *Multi-Sensory Materials:* Include items that stimulate multiple senses—such as textured fabrics, auditory materials (e.g., musical instruments), scented markers or herbs, and light-based tools (e.g., light tables). These help engage children with sensory processing differences and provide entry points for diverse learners.
- *Visual Supports:* Use visual schedules, step-by-step pictorial guides, and clearly illustrated rules or routines. These tools help children who benefit from structure and predictability, including those with autism spectrum disorder (ASD) or language processing delays.
- *Adapted Tools and Materials:* Provide scissors with loop handles, adaptive grips for pencils and markers, hand-over-hand tools, and voice-recording buttons for communication. Consider dual-language or symbol-supported labels for English learners or children using AAC (augmentative and alternative communication).
- *Seating Options:* Include seating variety—wobble stools, floor cushions, rocking chairs—to accommodate sensory and physical needs.
- *Lighting and Acoustics:* Use soft lighting and fabric panels or rugs to reduce noise. Harsh lights and echoes can overwhelm some children, particularly those with sensory sensitivities.
- *Choice and Independence:* Provide low, open shelving, labeled bins, and mirror-backed trays so children can easily access and return materials independently, supporting self-directed learning and confidence.

Storage and Organization

An organized environment helps children learn to care for shared spaces, supports executive functioning, and reinforces predictability and trust.

- *Accessible Storage:* Use open cubbies, pull-out drawers, or baskets on low shelving to ensure materials are within reach of all children.

- *Clear Boundaries*: Use labels and visual cues to delineate which areas are open, which are closed, and where specific materials belong.
- *Ownership and Responsibility:* Assign class roles such as “Materials Manager” or “Tool Organizer” to foster responsibility and community care.
- *Rotational Storage:* Reserve some materials and rotate them weekly or monthly to renew interest and manage clutter. Use see-through storage tubs for easy planning.

Labeling Systems

Labels foster literacy, independence, and consistency across all user groups.

- *Dual-Language Labels:* Include both the home languages of your children where possible (e.g., English/Spanish or English/Tagalog) to support multilingual learning.
- *Picture-Word Pairing:* Use real photos or simple illustrations alongside the words to scaffold early literacy and support visual learners.
- *Color Coding:* Assign colors to material types or learning zones (e.g., green for science, red for art). Color-coded labels can also assist children with limited reading skills in identifying where materials belong.
- *Interactive Labels:* Include QR codes or buttons that play audio descriptions or instructions to support pre-readers or children with visual impairments.

Flexible Stations/Areas/Centers

Designing for flexibility helps the environment evolve with children’s interests and projects.

- *Rolling Carts and Caddies*: Stock mobile carts with glue sticks, scissors, markers, and building supplies that can travel between zones, supporting group or outdoor work.
- *Modular Furniture:* Use stools that double as storage bins or tables that can be rearranged for group or solo work.

- *Pop-up Centers:* Temporary centers can be themed around seasonal provocations (e.g., fall leaves, light and shadow) or current classroom inquiries, offering timely, relevant engagement
- *Repurposable Surfaces*: Include chalkboard walls, whiteboard tables, and clear plexiglass panels for collaborative drawing, planning, and writing

Open Shelving

Visible, neatly arranged materials encourage exploration and choice.

- *Clear or Wooden Containers:* Use transparent or natural materials for bins so children can see what's inside without removing everything.
- *Photo-Based Display Tags:* Attach sample photos of the materials in use to spark ideas and encourage imaginative engagement.
- *Highlighting Materials:* Use display shelves or pedestals to showcase provocations, new tools, or rotating collections. This draws attention and models the value of materials and ideas.
- *Seasonal/Project Highlights*: Incorporate nature-based loose parts (e.g., shells in summer, pinecones in winter) to connect the environment to real-world cycles.

Starter Kit Essentials

Include a balanced mix of reusable, recyclable, and creative items:

- *Loose Parts:* Buttons, bottle caps, corks, feathers, string, cardboard tubes, fabric scraps, pipe cleaners, rubber bands, rocks, keys, metal washers, and more.
- *Art Supplies:* Crayons, markers, paint sticks, glue, collage materials, brushes, child-safe scissors, and pastels.
- Building Materials: Wooden blocks, magnetic tiles, LEGO, cardboard connectors (e.g., Makedo), foam bricks.
- *Fasteners and Adhesives:* Velcro, binder clips, masking tape, brass fasteners, child-safe glues.
- *Tactile and Sensory:* Kinetic sand, playdough, water beads, scoops, funnels.

Age-Appropriate Tech Tools

Technology should enhance creativity and interaction—not replace physical play.

- *Coding Exploration:* Bee-Bots, Cubetto, Osmo Coding, or simple Blockly-based tablet games.
- *Digital Storytelling:* iPad apps like Book Creator, ChatterPix, or Puppet Pals for story building and communication.
- *Tinkering Tools:* Light tables, sound exploration apps, child-safe microscopes, and recording tools for documentation.
- Creating a well-stocked makerspace doesn't require a large budget. Many materials can be sourced affordably or sustainably.
- *Low-Cost Retail:* Dollar stores, thrift shops, and discount art supply sites for basic tools and craft supplies.
- *Recycled & Upcycled Materials:* Cardboard boxes, bottle tops, paper tubes, fabric scraps, jar lids, yogurt containers, egg cartons, and more.
- *Community Donations:* Partner with families, local businesses, and libraries for regular material donations. Provide a materials wish list and clear safety guidelines.

Coding and Programming Tools

Simple, tangible tools that introduce sequencing, logic, and problem-solving:

- **Bee-Bots**: Programmable floor robots with directional buttons.
- **Cubetto**: Wooden robot controlled by physical coding blocks.
- **Osmo Coding Starter Kit**: Combines physical blocks with tablet apps.
- **Simple Blockly-based tablet games**: Apps that use drag-and-drop coding interfaces.
- **Kodable**: Child-friendly coding app with engaging characters.
- **Digital Storytelling Tools**: A curated collection of apps and sites for student storytelling.

- **Apps and devices that promote creativity and communication**: Tools that support children's expression through multimedia.
- **Book Creator**: Allows children to create interactive storybooks with text, images, audio, and video.
- **ChatterPix Kids**: Lets children animate photos and record their voices.
- **Puppet Pals**: Enables creation of digital puppet shows and stories.
- **Toontastic**: An app for making animated cartoons with voice narration.

Exploration and Documentation Tools

Tech that supports observation, tinkering, and recording of learning:

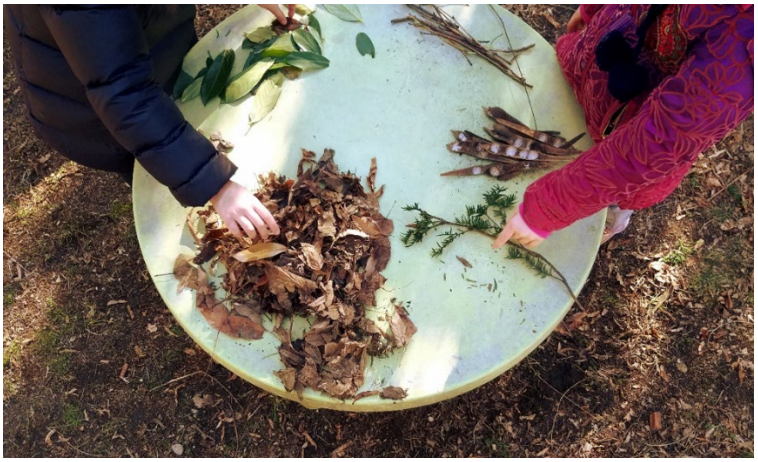
- *Child-safe microscopes:* Easy-to-use digital or optical microscopes for close-up exploration.
- *Light tables:* Illuminated surfaces with translucent manipulatives for sensory and scientific play.
- Sound exploration apps: Apps that allow children to create and manipulate sounds or music.
- *Digital cameras or tablets:* For photographing projects and documenting the learning process.
- *Voice recorders or communication buttons:* Devices that support non-verbal or early communicators.

Accessibility and Support Tools

Technology that aids diverse learners and promotes inclusivity:

- *Speech-to-text apps:* Assist children with language or motor challenges.
- *AAC (Augmentative and Alternative Communication) devices:* Tools supporting non-verbal communication.
- *Screen readers and magnifiers:* Support children with visual impairments.

See Appendix 1 – Suggested Materials Lists



Resources

For more information about creating your makerspace environment, visit one of these websites.

- MakerEd.org - Offers project guides, and curated resources to support equitable and developmentally appropriate makerspace design
- Tinkerlab - Focuses on creativity, loose parts play, and process art for young children.
- Fairy Dust Teaching - Focuses on Reggio Emilia-inspired environments and includes thoughtful material suggestions to foster creativity and inquiry in early childhood.
- RAFT (Resource Area for Teaching) - Offers affordable, upcycled, and creative materials for educators and makerspaces.
- Instructables - Offers projects and tutorials for K-2.
- Steampowered Family - Offers engaging, hands-on STEAM activities and experiments

PART FOUR: Curriculum Integration

A vibrant ECE STEAM makerspace goes beyond providing materials—it supports whole-child development through meaningful, integrated learning. In this space, STEAM concepts (Science, Technology, Engineering, Art, and Math) are not taught in isolation but embedded within playful, inquiry-driven experiences that align with developmentally appropriate practice (DAP).

Teachers foster curiosity, collaboration, and resilience by intentionally weaving STEAM into everyday exploration. Children build critical thinking skills while also strengthening early literacy, language, and social-emotional growth. Makerspace activities provide natural entry points for learning that are hands-on, joyful, and deeply connected to the real world.

Learning Key Components of Integrated Learning in a Makerspace

Use open-ended, playful challenges to spark imagination and problem-solving:

- “Can you design a bridge for your animal friends?”
- “What kind of machine could make music?”
- “How might we build a boat that floats?”
- Draw inspiration from sources such as Making and Tinkering With STEM: Solving Design Challenges With Young Children by Cate Heroman to scaffold design thinking and engineering habits of mind.

Inquiry-Based Learning Approaches

ECE Makerspaces will organically complement the principles of inquiry-based learning (IBL), an educational strategy rooted in children’s inherent curiosity, active exploration, and reflective thinking. In this environment, learning is not predetermined; instead, young learners are encouraged to guide their investigations through active questioning. Educators ignite and nurture this curiosity by posing open-ended prompts such as, "What do you wonder about this?" or "How can we solve this challenge?" These questions empower children to form personal hypotheses, explore diverse possibilities, and communicate their ideas effectively. As children experiment and iterate, they experience firsthand the freedom to test ideas, adapt strategies, and revisit their plans. This iterative process emphasizes that mistakes and adjustments are essential and meaningful learning components, helping children develop resilience, creativity, and critical thinking skills.

Central to nurturing and validating this inquiry process is thoughtful and ongoing documentation and assessment. Educators carefully collect evidence of children's ideas, problem-solving approaches, and developmental growth through methods such as notes, photographs, video recordings, and audio clips. Rather than focusing solely on finished products, documentation emphasizes the learning journey itself. These collected artifacts are thoughtfully organized into comprehensive portfolios, serving as dynamic, evolving records that clearly illustrate each child's progress, discoveries, and

emerging interests. Portfolios become valuable tools for reflective dialogue between educators, children, and families, capturing the essence of the learning experience.

Additionally, purposeful educator observations significantly enrich the inquiry process. By closely observing children's interactions with materials, peers, and challenges, educators gain deeper insights into individual learning styles, enabling them to provide personalized guidance and extend meaningful opportunities for further exploration. Complementing observations are learning stories—narrative assessments capturing vivid snapshots of significant moments during children's explorations. These stories celebrate successes, contextualize experiences within developmental milestones, and highlight emotional and social growth alongside intellectual achievements.

By integrating thoughtful questioning, experimentation, reflective documentation, and narrative storytelling, ECE Makerspaces considerably create a vibrant and holistic inquiry environment. They value children as capable learners, educators as supportive co-researchers, and assessments as meaningful reflections of the learning journey.

Encourage exploration through questioning, tinkering, and iteration:

- Support children in asking "What if?" and "Why did that happen?"
- Emphasize processes over products—celebrate the attempts, redesigns, and discoveries.
- Use learning stories, documentation panels, and portfolios to make thinking visible.
- Allow space and time for children to revisit and revise their work.

Cross-Curricular Connections

An ECE STEAM makerspace supports rich integration across learning domains:

- *Language and literacy:* Children narrate their designs, collaborate with peers, and describe processes.
- *Math and science:* Concepts such as patterning, measurement, cause and effect, and data collection are embedded in play.

- *Social-emotional learning:* Team projects, flexible problem-solving, and reflection support empathy, persistence, and self-awareness.
- *Creative arts:* Self-expression and aesthetic exploration happen naturally through design and material play.

Aligning with Standards and DAP

- Connect makerspace activities to early learning standards or frameworks (e.g., Head Start, state Pre-K standards).
- Ensure tasks are open-ended, exploratory, and appropriate to children's developmental levels.
- Offer a balance of structured provocations and unstructured exploration time.

Practice in Action

Makerspace learning should feel seamless and embedded in everyday classroom life:

- Integrate STEAM prompts into morning meeting questions or story time extensions.
- Add measuring tapes, building materials, or drawing supplies to block or dramatic play areas.
- Invite children to document their work with photos, sketches, or voice recordings.

Educators can transform a makerspace into a powerful site of integrated, joyful learning by embedding STEAM into familiar routines and allowing for curiosity-driven exploration.

See Appendix 2 – Links to Sample Lesson Plans and Websites

PART FIVE: Professional Learning

Creating and sustaining an effective ECE STEAM Makerspace depends on well-prepared educators who serve not as traditional instructors, but as facilitators of child-led exploration. High-quality professional learning equips educators with the skills, strategies, and mindset necessary to guide young learners through hands-on, inquiry-based experiences.

Training for Educators

Strong maker-centered facilitation begins with reimagining the educator's role. Rather than directing outcomes, educators learn to support children's thinking through intentional observation and open-ended questioning. Prompts such as:

- "What do you notice about this material?"
- "How else could we make this stronger?"
- "What did you learn from that?"

These guide children to reflect, persist, and problem-solve.

Educators are also trained to "step back" rather than "step in"—offering just-in-time support while allowing children to take ownership of their learning. This shift builds confidence, independence, and resilience in young makers.

Safety is another essential focus. Teachers must be confident using and supervising tools ranging from child-safe scissors and glue guns to low-tech robotics and building elements. Training includes:

- Setting and modeling safety expectations
- Assessing and managing risk
- Creating safe, developmentally appropriate exploration spaces

Equally important is cultivating a maker mindset in educators themselves. Teachers are encouraged to experiment, reflect, tolerate mess and ambiguity, and view mistakes as learning opportunities. Educators who model curiosity and perseverance foster a classroom culture where innovation and exploration thrive.

By combining facilitation strategies, safety practices, and a creative mindset, teachers become empowered leaders of joyful, meaningful learning in makerspaces.

Ongoing Support and Learning

ECE Makerspaces flourish through thoughtful design and engaging materials and a strong system of ongoing professional support that empowers educators to grow and evolve in their practice. At the heart of this system is developing active learning

communities among teachers. These communities may be informal peer-sharing circles or more formalized professional learning groups that meet regularly. Within these settings, educators collaboratively exchange ideas for new maker activities, reflect on successes and challenges, discuss classroom logistics, and explore the pedagogical underpinnings of maker-centered learning. These shared spaces of inquiry encourage a culture of continuous improvement and result in context-specific best practices tailored to the unique needs of their early childhood environments.

In addition to peer collaboration, targeted workshops are vital for building technical and pedagogical expertise. These hands-on sessions might introduce educators to new tools and materials—such as child-friendly robotics, simple circuits, or natural building elements—or explore innovative teaching approaches like design thinking and inquiry-based learning for young children. Workshops also offer guidance on integrating maker activities with early learning standards and curriculum goals, ensuring that making supports rather than sits apart from core educational objectives. They foster skill-building and conceptual growth, making educators more confident and equipped to lead meaningful maker experiences.

Equally important is personalized coaching, which provides individualized, ongoing support for educators. A dedicated makerspace coach or mentor can work alongside teachers in the classroom, offering feedback on facilitation strategies, helping modify activities to meet diverse learners' needs, and supporting classroom management within the active, often messy, makerspace setting. This real-time, in-context support helps educators reflect, refine, and deepen their practice.

Together, learning communities, workshops, and coaching form a holistic professional development model that ensures ECE educators are empowered, supported, and well-prepared to cultivate creative, child-centered makerspaces where young learners thrive.

PART SIX: Family and Community Engagement

Early learners do not develop attitudes towards STEAM in a vacuum. By embracing the adage, “it takes a village,” educators can lean into the strengths of early learners’ families and communities and foster intergenerational positive attitudes towards STEAM. This extends learning beyond the classroom and nurtures a culture of shared discovery and creativity.

Involving Families

Makerspaces provide a dynamic platform for meaningful family engagement. By hosting events for the whole family, they can offer a fun and welcoming environment for children and caregivers to work side by side on diverse projects while interacting with educators and fellow families.

Whether the event is a quick activity during student pick-up or a longer weekend workshop, the goal remains to facilitate joyful experiences in STEAM for all ages. The communal nature of these events strengthens relationships and builds a sense of belonging. Most importantly, fostering co-learning turns making into a shared

educational experience. Educators can model curiosity and collaboration by asking open-ended questions that invite both children and adults to reflect, predict, and test ideas together like, "What else could we try to make your bridge stronger?" or "I wonder what might happen if you tried a different material." This approach emphasizes the value of process over product, helping families feel more confident and capable in supporting their child's learning.

Another impactful method of fostering this engagement is through take-home kits. Thoughtfully curated kits with age-appropriate materials and clear instructions invite families to participate in hands-on making at home and understand that STEAM does not just happen in a classroom. Some enhancements, like QR codes linking to instructional videos and open-ended prompts, help guide exploration while encouraging creativity and problem-solving.

By integrating maker events and take-home kits, ECE makerspaces can be powerful tools for strengthening the home-school connection, demystifying STEAM content for families, and cultivating a culture of lifelong learning. These experiences enhance cognitive and creative development in young children and create meaningful opportunities for families to connect, contribute, and grow together.

Community Partnerships

ECE makerspaces provide an ideal platform for cultivating meaningful community partnerships that enhance children's learning and connect families to broader social networks.

Collaborating with local libraries can strengthen early literacy while expanding access to educational resources. Libraries may offer mobile maker kits, host interactive STEAM story times, provide book recommendations to complement STEAM activities, or co-sponsor events for children to construct creations inspired by books, blending imagination with hands-on making.

Partnerships with museums, particularly children's museums and science centers, bring valuable learning extensions through immersive exhibits, specialized materials, and

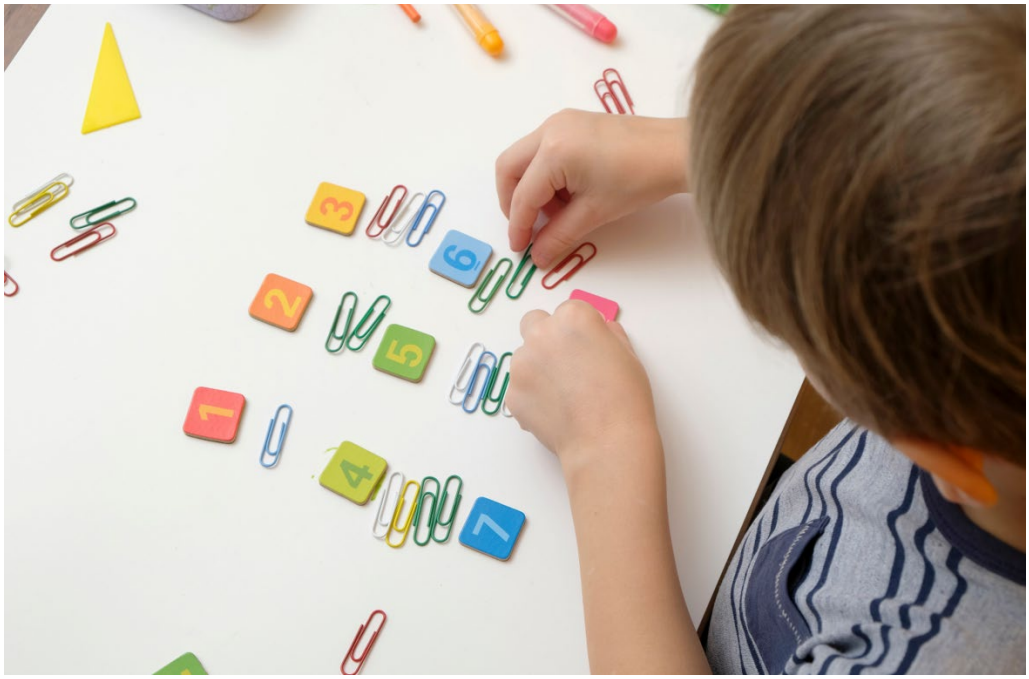
aligned field trips. Many museums offer outreach services, including traveling exhibits, educator training, or in-school demonstrations that complement makerspace themes and methodologies.

Welcoming local artisans into the makerspace introduces children to diverse crafts and traditional skills. Artists such as woodworkers, potters, or textile makers can demonstrate their creative processes, offer mini-workshops, and provide culturally relevant experiences celebrating local heritage. These connections enrich the sensory and imaginative landscape of the makerspace while nurturing an appreciation for manual craftsmanship.

Engaging STEAM professionals, including engineers, coders, designers, tradespeople, and scientists, further deepens learning by linking classroom activities to real-world applications. These professionals can facilitate hands-on challenges tailored for young learners, offer mentorship to educators and students, or participate in community maker events. These partnerships can demystify complex fields, provide diverse representation, and ignite early interest in innovation.

These partnerships are most impactful when sustained, forming an ecosystem that integrates community wisdom into everyday learning. They offer diverse role models, expand learning opportunities, and help families see themselves as active contributors to their children's education. Through these collaborative efforts, an ECE makerspace can become a dynamic, community-rooted learning hub—one that nurtures curiosity, celebrates diversity, and builds strong foundations for lifelong learning both within and beyond the classroom walls.

PART SEVEN: Metrics and Evaluation



Metrics and self-evaluation are critical to managing an effective ECE STEAM Makerspace because they enable continuous reflection, informed adaptation, and sustainable growth. Regularly assessing activities, engagement levels, and children's learning outcomes provides valuable insights into what is working well and what needs adjustment, ensuring that the makerspace evolves to meet children's developmental and educational needs better. Documented evaluations offer concrete evidence for scaling successful activities or adapting approaches that may require improvement. Additionally, clear metrics strengthen grant applications by demonstrating impact and accountability, reassuring funders that their investment is making a tangible difference. Furthermore, showcasing measurable successes, such as improvements in children's creativity, problem-solving abilities, or collaboration skills, helps to celebrate achievements and garner community support and recognition. Ultimately, ongoing evaluation fosters a culture of reflective practice, continuous improvement, and transparent communication with all stakeholders involved. Below serves as an example of such a tool in any review or evaluation.

Use the following criteria to evaluate and manage your ECE Makerspace.

1. Framework
    a. Mission is clear, grounded in principles and practices of ECE STEAM Makerspace, and known by all.
    b. Vision is sound and perceptive, and known by all.
    c. Goal(s) are practical, measurable, and known by all.
2. Principles
    a. ECE Makerspace meets developmentally appropriate standards.
    b. ECE Makerspace meets safety standards.
    c. ECE Makerspace principles are interdisciplinary and address STEAM concepts
    d. ECE Makerspace is play-based
    e. ECE Makerspace addresses sensory exploration for young children
    f. ECE Makerspace is inclusive for all children so they can be successful
3. Environment
    a. Areas are clearly defined and easily accessed.
    b. The layout of the space is adaptable and multi-purpose.
    c. The environment is safe and organized.
    d. The environment has a visual appeal.
    e. The environment blends natural elements into its space.
    f. The environment is comfortable and engaging.
    g. The environment manages light and noise levels well.
    h. The environment maintains temperature and air quality well.
    i. The area does not obstruct movement or other physical activity.
4. Materials
    a. Materials are age-appropriate.
    b. Materials are safe and non-toxic.
    c. Materials are diverse and address STEAM concepts
5. Curricular Activities

    a. Activities are age-appropriate for young children.
    b. Activities are interdisciplinary.
    c. Activities are inquiry-based.
    d. Activities promote problem solving and innovation.
    e. Activities are collaborative.
    f. Activities provide opportunities to be creative and to make.
    g. Activities involve parents/families and the community.
6. Professional Learning
    a. Professional learning opportunities for the staff
    b. Regular meetings with stakeholders
7. Communication
    a. Develops a communication plan
    b. Communicates achievements with families and communities
    c. Provides opportunities for children to showcase their creations
    d. Communicates using various social media platforms
8. ECE Makerspace Continuous Improvement
    a. Utilizes tools for ongoing self-assessment and improvement.
    b. Follow strategies to support sustainability practices
    c. Adapts environment, curriculum, and practices as needed to support the children and activities

Effective metrics and self-evaluation are essential to managing a high-quality ECE STEAM Makerspace. They enable continuous reflection, data-informed adaptation, and sustainable growth—ensuring the makerspace evolves to meet children's developmental and learning needs more effectively over time.

Regular assessment of activities, engagement, and children's learning outcomes provides concrete insights into what is working well and where improvements are needed. Documented evaluations offer evidence to support scaling successful practices or refining approaches that require adjustment.

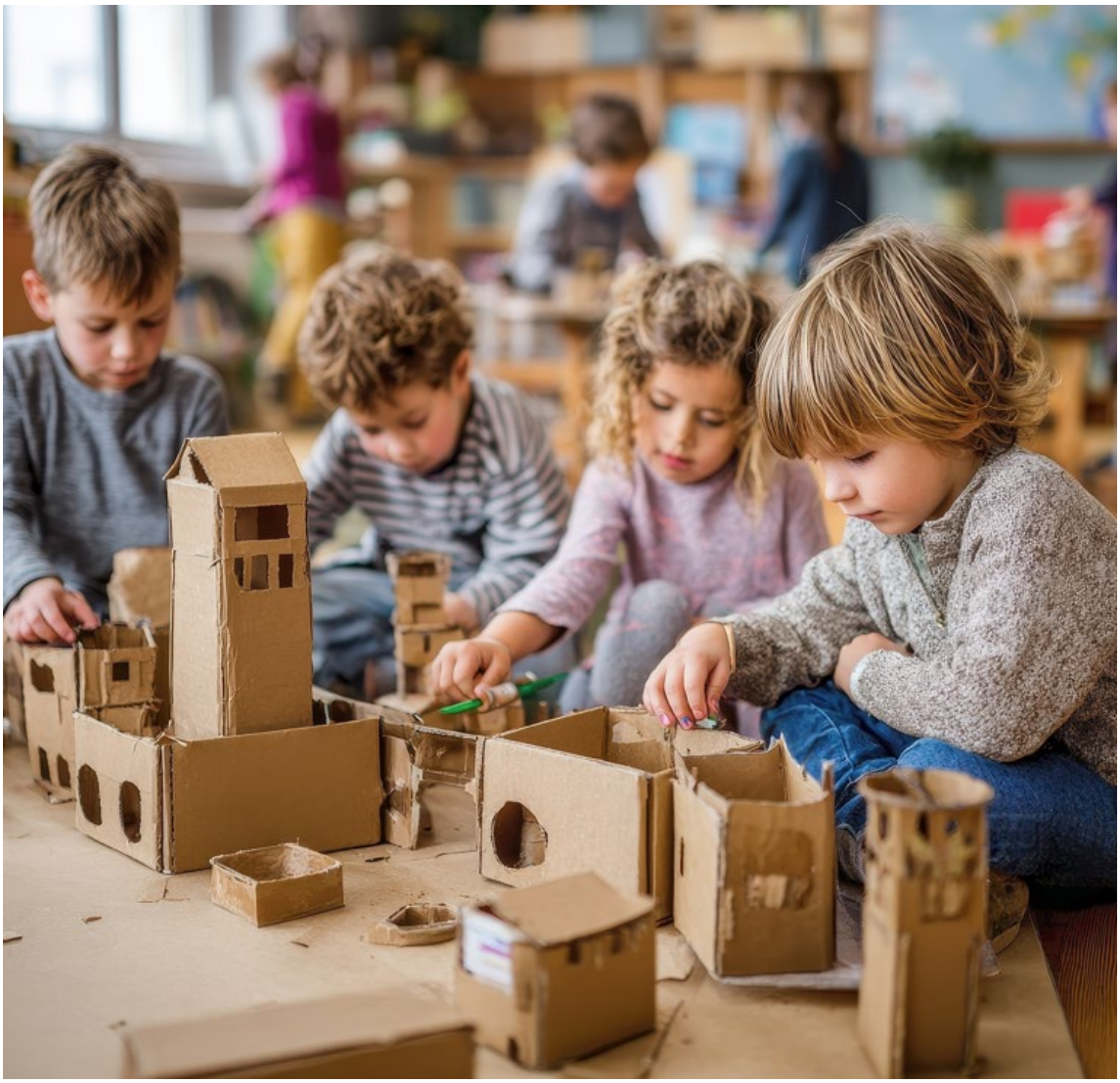
Clear and meaningful evaluation data also strengthen grant applications and demonstrate accountability to funders, reassuring them that their investment produces measurable impact(s). Sharing successes—such as gains in creativity, problem-solving, collaboration, and STEAM skills—fosters community support and celebrates achievements with all stakeholders.

Beyond accountability, evaluation cultivates a culture of reflective practice and continuous improvement among educators and leaders. It supports transparent communication and collaboration with families, staff, administrators, and community partners, aligning everyone around shared goals for the makerspace.

To support these efforts, this section provides practical, actionable tools to assess key areas of your makerspace, including framework clarity, principle compliance, environmental quality, curricular effectiveness, professional learning, communication, and ongoing improvement. Using these tools systematically ensures that evaluation becomes an integral and manageable part of your makerspace's ongoing success.

See Appendix 3 for Stakeholder Survey, Interview Guide, and Framework Evaluation Ideas

Part Eight: Conclusion



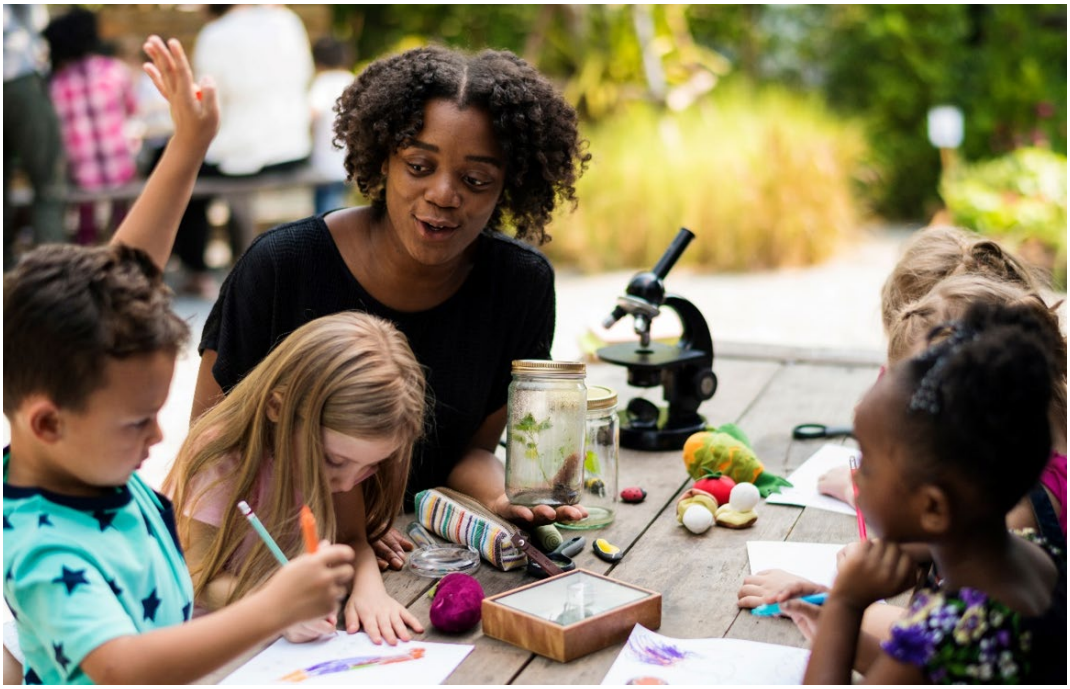
Tiny Innovators: A Toolkit for Creating an ECE STEAM Makerspace is designed to inspire, guide, and empower early childhood educators, administrators, and community partners in creating engaging, inclusive, and developmentally appropriate makerspaces for children ages 3–8. The toolkit is grounded in research-based guiding principles that celebrate play-based learning, open-ended exploration, and culturally responsive practices. These foundational approaches ensure that every child—regardless of background, ability, or prior experience—can engage meaningfully in STEAM learning through making, tinkering, and imagining.

From the initial planning phases such as identifying needs, setting goals, defining your audience, and selecting materials and tools to envisioning the physical layout and environment, the toolkit offers step-by-step support tailored for the unique contexts of early learning settings. Practical considerations around inclusive design, accessibility, safety, and appropriate technology use ensure that your makerspace will be welcoming and functional for all learners. Thoughtful attention is also given to cross-curricular connections that help educators integrate STEAM concepts seamlessly into daily instruction, aligning with early learning standards while remaining flexible and joyful.

In addition, the toolkit recognizes the essential role of adults in sustaining a successful makerspace. It provides robust strategies for professional learning and educator training, helping teachers build confidence and deepen their practice as facilitators of inquiry-based learning. Recognizing the importance of partnerships, it also includes tools for engaging families and communities, fostering a shared sense of ownership and investment in the learning space. To support long-term success, the toolkit offers guidance on establishing metrics for evaluation, allowing programs to reflect on and refine their approach over time.

Rich with reflective prompts, real-world examples of practice, and curated resources including websites, books, and articles, *Tiny Innovators* is more than a toolkit; it is an invitation to reimagine early learning environments as spaces of innovation, equity, and wonder. Whether you are just beginning or expanding an existing effort, this resource supports your journey in nurturing confident, curious, and capable young makers who are ready to shape the future—one small spark at a time.

PART Nine: References and Resources



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Grants and Funding Resources

A list of possible funding sources you can explore to support the creation of an Early Childhood STEAM Makerspace is found below. Kindly note that the list provided is meant as a guide and may not always provide funding.

Government Grants

- State Department of Education
- State Initiatives
- County and/or City Projects

Private Foundations and Organizations

funding page, where available:

- **LEGO Foundation Grants** – Supports innovative approaches to learning through play, particularly in early childhood and primary education settings.
- **The Bill & Melinda Gates Foundation** – Funds initiatives that improve education access, equity, and outcomes, including early learning and K–12 transformation.
- **PNC Foundation Grow Up Great Program** – Provides grants for high-quality early childhood education programs, with a focus on school readiness in underserved communities.
- **W.K. Kellogg Foundation** – Offers funding for programs that advance equitable early childhood education, community engagement, and family support.
- **Google for Education** – Shares funding opportunities and grant programs that support technology integration and innovation in education.
- **Intel Foundation** – Invests in education initiatives that promote STEM learning and technology access, especially for underrepresented populations.
- **Chevron's Fuel Your School** – Supports local classroom projects, particularly those focused on STEM education in K–12 schools.
- **3M Education Grants** – Provides funding to promote equitable STEM education, teacher development, and innovation in schools and learning environments.

- **Tinker Foundation** – Supports projects that advance policy, education, and sustainable development, with occasional opportunities related to STEAM and early childhood education.
- **Kapor Center** – Funds programs that close gaps in access to STEM education for underrepresented communities through innovation and equity-centered design.
- **Bezos Family Foundation** – Invests in early learning and youth leadership programs that promote whole-child development and lifelong learning.
- **Target** – Provides local education grants through its philanthropic initiatives, supporting early literacy, enrichment, and family engagement.
- Other philanthropic organizations or foundations

Corporate Grants and Sponsorships

- **Google Community Grants**
  - Google Ad Grants: Provides eligible nonprofits with up to $10,000 per month in free Google Ads to promote their missions.
  - Google for Nonprofits: Offers access to various Google tools and services tailored for nonprofit organizations.
  - Google.org: Showcases Google's philanthropic efforts, including funding initiatives and community programs.
- **Verizon Innovative Learning Grants**
  - Verizon Innovative Learning: An initiative providing free technology, internet access, and innovative learning programs to under-resourced communities.

    🔗 https://www.verizon.com/about/responsibility/digital-inclusion/verizon-innovative-learningthejournal.com+1verizon.nacce.com+1
  - Grant Requirements: Details eligibility criteria and guidelines for Verizon's grant programs.

📎 https://www.verizon.com/about/responsibility/grant-requirementsverizon.com

- **Honda Foundation**
  - Honda USA Foundation Funding: Offers grants to nonprofit organizations and schools supporting programs in education, environment, mobility, traffic safety, and community.

    📎 https://csr.honda.com/longform-content/honda-usa-foundation-funding/csr.honda.com+6hondanews.com+6hondanews.com+6
  - American Honda Foundation: Provides grants to U.S. nonprofits focusing on youth and scientific education.

    📎 https://csr.honda.com/sub-feature/american-honda-foundation/csr.honda.com
- **Samsung Solve for Tomorrow**
  - Solve for Tomorrow Contest: A nationwide competition encouraging students in grades 6–12 to use STEM to address community issues, with opportunities to win Samsung technology and resources.

    📎 https://www.samsung.com/us/solvefortomorrow/pages.samsung.com+10news.samsung.com+10news.samsung.com+10
  - Program Overview: Provides insights into the contest's objectives, structure, and impact stories.

    📎 https://www.samsung.com/us/about-us/corporate-citizenship/solve-for-tomorrow/news.samsung.com+4csr.samsung.com+4samsung.com+4
- **Scholastic**
  - Corporate Social Responsibility: Highlights Scholastic's commitment to literacy, including programs like the Scholastic Art & Writing Awards.

    📎 https://www.scholastic.com/aboutscholastic/corporate-social-responsibility/scholastic.com

- Funding Connection: Offers resources and guidance for educators seeking grants and funding opportunities.

  📎 https://teacher.scholastic.com/products/fundingconnection/grant_resources/guidance_samples/index.htmleducation.scholastic.com+1teacher.scholastic.com+1

- **Barnes & Noble**
  - Sponsorships and Charitable Donations: Supports local pre-K–12 schools and nonprofit organizations focusing on arts, literacy, and community service through in-store events and bookfairs.

    📎 https://www.barnesandnobleinc.com/about-bn/sponsorships-charitable-donations/barnesandnobleinc.com+1fundsforngos.org+1
  - Help Center – Sponsorships and Donations: Provides information on how to request sponsorships or donations from Barnes & Noble stores.

    📎 https://help.barnesandnoble.com/hc/en-us/articles/5401844897947-Sponsorships-and-Donationshelp.barnesandnoble.com+1barnesandnobleinc.com+1

Local and Community-Based Funding

- Local universities' early childhood or education departments
- Local Rotary Clubs
- Chambers of Commerce
- Community Development Block Grants (CDBG)
- Credit Unions and Local Banks

Crowdfunding and Online Platforms

- DonorsChoose.org
- GoFundMe
- ClassWish
- AdoptAClassroom.org

Educational Associations and Networks

- National Association for the Education of Young Children (NAEYC)
- National Council of Teachers of English (NCTE)
- National Council of Teachers of Mathematics (NCTM)
- National Science Teaching Association (NSTA)
- Association for Supervision and Curriculum Development (ASCD)
- Council for Exceptional Children (CEC)
- National Education Association (NEA)
- Association for Childhood Education International (ACEI)
- National Head Start Association (NHSA)

Professional STEAM Organizations

- Society of Women Engineers (SWE)
- American Society for Engineering Education (ASEE) Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)

Local Fundraising and Community Engagement

- Parent-Teacher Associations (PTAs/PTOs)
- Local School District Funding

PART Seven: Appendix

Appendix 1 – Suggested Materials List

Here's a suggested list of materials for an early childhood makerspace. This list blends the artistic, open-ended, sensory-rich environment of the Reggio philosophy with the hands-on, inquiry-driven tools of a makerspace, fostering creativity, exploration, and early STEAM learning.

🎨 Art & Atelier Materials

Focus: expression, aesthetics, material exploration

- Tempera and watercolor paints
- Natural clay and air-dry clay
- Charcoal, oil pastels, chalk pastels
- Colored pencils, fine markers, crayons
- Transparent and translucent papers (tissue, vellum, cellophane)
- Varied papers (kraft, recycled, watercolor, textured, cardboard)
- Fabric scraps, yarn, thread, ribbon, felt
- Beads, buttons, sequins, shells, and pebbles
- Glue sticks, white glue, tape (masking, washi, painter's)
- Scissors (child-safe and adult)

- Collage materials (magazines, old books, nature clippings)
- Light table and translucent materials (gems, shapes, nature items)
- Drawing boards, easels, and clipboards
- Mirrors (for self-portraits and light play)

Construction & Loose Parts

Focus: engineering, spatial awareness, open-ended design

- Wooden blocks in various shapes and sizes
- Unit blocks, foam blocks, cardboard bricks
- Natural materials (sticks, pinecones, bark, stones, corks)
- Recyclables (bottle caps, tubes, egg cartons, cardboard pieces)
- Loose parts trays (organized by size, color, texture)
- Magnatiles, LEGO® Duplo, Tinkertoys, or wooden train sets
- Nuts, bolts, washers, and child-safe tools
- Peg boards, gears, and pulleys
- Balance scales and ramps

Science & Discovery Tools

Focus: inquiry, observation, early experimentation

- Magnifying glasses, bug viewers, and observation jars
- Microscopes (child-friendly)
- Nature specimens (leaves, flowers, pinecones, feathers)
- Measuring tapes, rulers, measuring cups/spoons
- Water and sand table with scoops, funnels, tubes
- Sorting trays and nature collection boxes
- Digital thermometer, hand lens, and eye droppers
- Flashlights, prisms, and mirrors for light exploration
- Balance and motion materials (marbles, ramps, balls)

🧠 Technology & Maker Tools

Focus: creativity, early computational thinking, design

- Tablet with child-friendly apps for drawing/coding (e.g., ScratchJr, Toca Builders)
- Bee-Bots or similar coding robots
- Light circuits (Snap Circuits Jr., simple LEDs and batteries)
- Makey Makey kits or Squishy Circuits
- Digital camera and/or video recorder (for documentation)
- Headphones and microphone (for storytelling, voice recording)
- iPad stands or tripods
- Cardboard construction kits (e.g., Makedo tools)
- 3D pens (supervised use), or 3D printing services (optional)

🧵 Tinkering & Tool Use

Focus: fine motor skills, making, and repair

- Hammers, screwdrivers, and hand drills (child-safe)
- Workbench with vices or clamps
- Wood scraps, nails, screws, washers
- Hole punchers, wire cutters, pliers (with guidance)
- Wire, pipe cleaners, zip ties, twist ties
- Velcro, snaps, magnets
- Tape (duct, double-sided, painter's, electrical)
- Safety goggles, gloves, and smocks/aprons

📚 Documentation & Reflection

Focus: process awareness, metacognition, collaboration

- Clipboards, sketchbooks, journals
- Dry-erase boards, chalkboards
- Digital portfolios or apps (e.g., Seesaw, Google Slides)

- Photo printer for displaying children's work
- "Learning Panels" or wall displays for work-in-progress
- Labels and signs created with children's input'
- Space for displaying children's work

Appendix 2 - Links to Sample Lesson Plans

Websites

- National Association for the Education of Young Children (NAEYC)
- Teach Preschool
- Gryphon House
- PBS Kids / PBS LearningMedia
- Exploratorium Tinkering Studio
- Community Playthings – Makerspace Resources
- Project Learning Tree (PLT) – Early Childhood
- Scholastic Teachers – Preschool Activities
- TinkerLab
- The STEM Laboratory

See Appendix 3 for Stakeholder Survey, Interview Guide, and Framework Evaluation Ideas

Purpose: To assess how clearly the makerspace's mission, vision, and goals are understood and embraced by key stakeholders including educators, families, and administrators.

Use: Conduct surveys for broad input on clarity, alignment, and engagement with the makerspace's purpose. Follow up with in-depth interviews to gather qualitative insights and stories.

Who: Program leaders, coordinators, or evaluators administer the survey to all stakeholders and conduct interviews with a representative sample to deepen understanding.

Sample Survey Questions (For Educators, Families, Administrators)

1. How clearly do you understand the makerspace's mission and goals?

   (Scale: Very unclear / Somewhat unclear / Neutral / Somewhat clear / Very clear)

2. To what extent do you feel the makerspace supports children's creativity?

   (Scale: Not at all / A little / Somewhat / Mostly / Completely)

3. To what extent do you feel the makerspace promotes STEAM skills?

   (Scale: Not at all / A little / Somewhat / Mostly / Completely)

4. How well do you think the makerspace aligns with our center's mission and values?

   (Scale: Not at all / A little / Somewhat / Mostly / Completely)

5. How confident are you that the makerspace's goals are achievable with current resources?

(Scale: Not confident / Slightly confident / Moderately confident / Very confident/Extremely confident)

6. How involved do you feel in the makerspace's planning or development?

   (Scale: Not involved / Slightly involved / Moderately involved / Very involved / Extremely involved)

7. What do you see as the biggest strengths of the makerspace's mission and goals? (Open-ended)
8. Are there any aspects of the mission or goals that need improvement or clarification? (Open-ended)
9. What additional supports or information would help you better understand or engage with the makerspace? (Open-ended)
10. What are your hopes for the future development of the makerspace? (Open-ended).

Sample Interview Guide (For Deeper Conversations)

1. Can you share a specific example of how the makerspace has positively impacted children's learning or engagement?
2. How does the makerspace's mission influence your approach to facilitating or supporting children's exploration?
3. Do you find the makerspace's current goals practical and achievable? Why or why not?
4. What parts of the makerspace's mission or vision inspire or motivate you the most?
5. Are there any areas of the mission or goals that you feel could be communicated more clearly?
6. How well do you think the makerspace meets the diverse needs and interests of the children and families served?
7. What challenges or barriers do you see that might hinder achieving the makerspace's goals?

8. In what ways could leadership better support the makerspace's mission and goals?
9. What opportunities do you see for strengthening the makerspace's impact on children's STEAM learning?
10. How do you envision your role evolving as the makerspace grows and changes?
11. Have you received any feedback from families or colleagues about the makerspace's mission and goals? What did they say?
12. What additional resources, training, or support would help you better fulfill the makerspace's vision?

Stakeholder Survey Template — Makerspace Framework Evaluation

Instructions: Please rate each statement and provide additional comments as needed.

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Comments Or Examples
I clearly understand the overall purpose of our makerspace.						
The makerspace goals align with our center's mission and values.						
The makerspace supports children's creativity effectively.						
The makerspace promotes STEAM						

skills in meaningful ways.						
The goals of the makerspace are achievable with current resources and staffing.						
I feel adequately informed about the makerspace's mission and goals.						
I feel involved or consulted in the makerspace's planning and development.						

Open-Ended Questions

1. What do you see as the biggest strengths of our makerspace's mission and goals?
2. Are there any areas of the makerspace's purpose or goals that you feel need clarification or improvement?
3. What additional support or information would help you better engage with the makerspace's mission?
4. Please share any other thoughts or suggestions related to the makerspace's vision and goals.

Interview Protocol — Makerspace Framework Evaluation

Introduction: Thank you for participating in this interview to help us understand how well our makerspace's mission, vision, and goals are understood and implemented. Your honest feedback will help us improve.

1. How would you describe the makerspace's overall purpose?
2. Can you provide an example of how the makerspace has impacted children's learning or engagement?
3. In what ways does the makerspace's mission influence your role or daily work?
4. Do you find the makerspace's goals clear and achievable? Why or why not?
5. What parts of the makerspace's vision inspire or motivate you the most?
6. Are there areas where the mission or goals could be communicated more clearly?
7. How well do you think the makerspace meets the needs and interests of the children and families we serve?
8. What challenges or barriers exist that might affect achieving the makerspace goals?
9. What support or resources would help you better fulfill the makerspace's mission?
10. How do you see your role evolving as the makerspace grows?
11. Have you received any feedback from families or colleagues about the makerspace's mission?
12. What opportunities do you see for enhancing the makerspace's impact on STEAM learning?
13. Closing: Thank you for sharing your insights. Is there anything else you'd like to add or suggest?

Principles Compliance Checklist

Purpose: To systematically evaluate whether the makerspace meets essential principles such as developmental appropriateness, safety, inclusivity, and STEAM integration.

Use: Facilitators or observers use this checklist periodically to identify areas of strength and opportunities for improvement. It supports ongoing quality assurance.

Who: Makerspace educators, lead facilitators, or external evaluators can complete the checklist collaboratively or independently.

Principle	**Yes**	**Partially**	**No**	**Notes / Examples**
Materials & activities are developmentally appropriate				
Safety standards are consistently met				
STEAM concepts are integrated into activities				
Play-based learning is evident				
Sensory exploration opportunities are provided				
Environment and practices are inclusive				

Environmental Walkthrough Rubric

Purpose: To assess the physical environment of the makerspace, including layout, safety, accessibility, comfort, and aesthetics.

Use: Use this rubric during scheduled walkthroughs to rate the environment on key criteria, document observations, and prioritize enhancements.

Who: Facility managers, educators, and administrators conduct walkthroughs, ideally with input from children and families for a fuller perspective.

Category	1 Needs Improvement	2 Developing	3 Proficient	4 Exemplary	Notes / Evidence
Zones are clearly defined and accessible					
Layout supports flexibility and multi-use					
Environment is safe and well-organized					
Visual appeal is inviting and appropriate					
Natural elements incorporated					
Comfortable seating and workspaces					
Lighting and noise levels well-managed					
Temperature and air quality maintained					
Movement and physical activity not obstructed					

Curricular Activity Observation Rubric

Purpose: To evaluate how well individual activities support age-appropriate, interdisciplinary, inquiry-based, collaborative, and creative learning.

Use: Observers use the rubric to rate activities during facilitation or reflection sessions, providing feedback to educators for improvement.

Who: Program coordinators, peer educators, or external evaluators observe and assess activities, ideally in collaboration with educators.

Curricular Activity Observation Rubric

Dimension	**1 Emerging**	**2 Developing**	**3 Proficient**	**4 Exemplary**	**Notes / Examples**
Age appropriateness	Activity poorly matches developmental level	Some elements appropriate	Mostly appropriate	Fully developmentally appropriate	
Interdisciplinary	Little to no connection between domains	Some interdisciplinary elements	Clear interdisciplinary integration	Seamless interdisciplinary connections	
Inquiry-based	Mostly directive, little child input	Some inquiry elements	Encourages child questions	Child-driven inquiry and exploration	
Promotes problem-solving	Minimal problem-solving opportunity	Some problem-solving tasks	Clear problem-solving focus	High-level, open-ended problem-solving	
Encourages collaboration	Little to no group interaction	Some group work encouraged	Group work evident	Collaboration is integral	
Supports creativity & making	Limited creative choice	Some creative options	Good creative opportunities	Open-ended, multiple creative paths	
Family/community involvement	None	Minimal	Occasional	Integrated and ongoing	

Professional Development Log & Feedback Form

Purpose: To document educator learning opportunities and collect feedback on the effectiveness and relevance of professional development.

Use: Maintain a log of all training sessions and workshops. Collect post-training feedback to inform future professional learning offerings.

Who: Professional development coordinators or program leaders track sessions and distribute feedback forms to participating educators.

Log Template

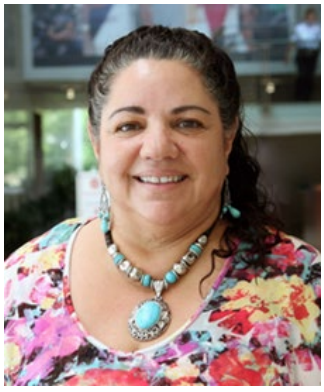
Date	Training/Workshop Topic	Facilitator	Attendees	Summary of Content	Follow-up Needed (Y/N)	Notes

Feedback Form Questions:

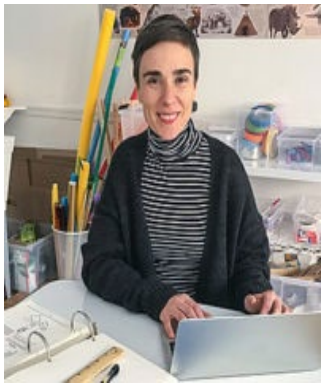
1. How relevant was this training to your work in the makerspace? (1–5 scale)
2. What was the most valuable takeaway?
3. What topics do you wish had been covered more deeply?
4. How confident do you feel applying what you learned? (1–5 scale)
5. Suggestions for future professional learning?

Beyond 100K Members

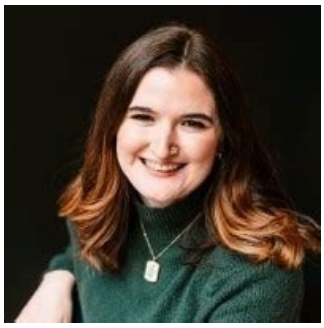
Biographies



Zee Cline is the Statewide Director of the California Academic Partnership Program (CAPP). CAPP is an intersegmental program working with the three segments of higher education and the K-12 system. Under Dr. Cline's leadership, CAPP has launched two grants: the CAPP Demonstration Project, which helps schools build post-secondary partnerships, and College Going Culture Grant, which helps schools develop a college-going culture. CAPP is also responsible for the Mathematics Diagnostic Testing Project, an intersegmental collaborative effort that has been developing diagnostic tests for more than 30 years. Prior to joining the Chancellor's Office, Dr. Cline was a professor at CSU San Marcos.



Meghan Eison is the Co-Founder & Executive Director of The League of Young Inventors in NYC. She holds a B.A. in Sociology from Wesleyan University and M.Sc. in Political Science from University of London's Birkbeck College. She has over fourteen years of experience working in education. She served as a School Developer for two educational nonprofits, Eskolta and Good Shepherd Services where she supported the opening and ongoing operations of 12 public transfer high schools in New York City. Prior to that, she worked at the NYC Teaching Fellows on their teacher selection team.



Shannon Gaussa is Associate Director of Learning and Engagement at Carnegie Science Center. After earning a degree in early childhood education with a focus on STEM education from the University of Dayton, she began her career in formal education as an elementary school teacher. While doing part-time work in the evenings and summers as an educator at Carnegie Science Center, she found herself excited by the potential for informal STEM education to be a force for equity and an avenue for unlocking creativity and problem solving in learners of all ages. Shannon transitioned to full-time work at the Science Center with positions including student equity programs supervisor, workforce and community readiness program coordinator, and early childhood and elementary content manager. She is passionate about STEM education as a tool to empower people to be curious about themselves and the world around them, and to develop a sense of connection to nature and their communities. Shannon brings this passion to her current role leading a team focused on educational strategy, grant funding, content development, and breaking down barriers across the museum to facilitate program evaluation and collaboration.

Nardos Ghebreab is the Senior Program Manager at Beyond 100K where she leads the planning and implementation of its Tier 2 programs to support partners in engaging with and learning from one another. These longer-term programs are designed to advance partners' learning and action towards their STEM teaching and learning commitments with special attention to equity, representation, and belonging in STEM. Nardos holds a Ph.D. in Teaching and Learning, Policy and Leadership, specializing in Urban Education from the University of Maryland, College Park where her

research focuses on anti-racism and cultural sustainability in teacher education, pedagogy, and curriculum development. She has also earned her M.S. in Education Research, concentrating on quantitative methods, and a B.A. in Sociology.

Dorothy Jones-Davis is the Chief Impact Officer at KID Museum, where she leads efforts to optimize and convey KID Museum's impact to key stakeholders and partners. Prior to joining KID Museum, she served for 5 years as the founding Executive Director of Nation of Makers, a national nonprofit dedicated to helping support America's maker organizations through community building, resource sharing, and advocacy. Dorothy holds a B.A. in psychobiology from Wellesley College, an M.S. in Neuroscience from the University of Michigan, and a Ph.D. in Neuroscience from the University of Michigan.

Annalise Phillips is the Managing Director of Programs and Learning Innovation and leads the Programs team in developing innovative and engaging curriculum and programs. Prior to joining KID Museum, Annalise was at the University of California, Berkeley where her work focused on diversity, equity and inclusion in making. She has managed makerspaces on both coasts, working with learners ranging from Pre-K to graduate students. She holds a master's degree in teaching from Alliant University, and a Bachelor of Arts degree in English Literature and Creative Writing from the University of San Francisco.

Sandy Roberts is the Education Program Manager at Science Friday, where she creates learning resources, content, and experiences to advance STEM equity in all learning environments. Sandy has participated in and presented at Maker Faires along the East Coast since 2012 where she has won numerous awards for her educational activities. Channeling the Maker Movement into education, she has overseen the development of three makerspaces, written The Big Book of Maker Camp Projects (McGraw-Hill 2019), and served as Maker Camp Coordinator and Community Manager for Make: Magazine. She is currently sitting on the Executive Board for New Jersey Makers Day.

Hilary Seitz is a Director of Educator and Leadership Programs. She supports systemwide efforts to strengthen educator preparation pathways, spanning from dual enrollment and community college to teacher credential programs within the California State University (CSU) system. She provides leadership for the implementation of the new PK-3 Early Childhood Education (ECE) Specialist Credential and oversees a range of ECE initiatives across the CSU. She is a faculty emerita in Early Childhood Education at the University of Alaska Anchorage, where she held multiple faculty and administrative appointments. Her professional teaching experience includes 17 years of teaching in public preschool settings, as a reading specialist, and in various primary grade classrooms. A proud alumna of Chico State, she is a committed early childhood educator, a dedicated advocate for children and their families, a creative scholar, and an innovative practitioner. Hilary is a passionate early childhood educator, an advocate for young children and their families, a creative thinker, a scholar, and a maker.

Janet Stramel is a Professor and Edna Shutts Williams Endowed Chair in the College of Education at Fort Hays State University in Hays, Kansas. She joined FHSU after teaching middle school mathematics for 25 years. She currently teaches courses in mathematics methods for preservice teachers. Her research focuses on STEM teaching and learning in rural schools. Janet earned her Ph.D. at Kansas State University and taught middle school mathematics in Guthrie, OK and Wamego, KS. Outside the classroom, Janet is an accomplished pianist and enjoys traveling.

Fred Uy serves both as a Director in the Department of Educator and Leadership Programs and Co-Director for the Center for the Advancement of Instruction in Quantitative Reasoning. Before joining the Office of the Chancellor, Dr. Uy was a Professor of Mathematics Education at Cal State LA and a K-12 mathematics teacher. In this position, he is responsible for overseeing and increasing the capacity of the department to provide leadership and support to the educator preparation programs on campuses across the CSU. He also has served as a mathematics consultant for school districts and publishers and has conducted numerous professional development trainings workshops in topics like mathematics pedagogy, STEM connections, multicultural mathematics, assessments, arts integration, and bilingual/multilingual education.