

# JUSTICE-ORIENTED DESIGN: WAYS TO RE-IMAGINE INFORMAL STEM LEARNING

	Designing Experiences	Fostering group discourse norms + routines (learning culture)	Building respectful relationships with youth, family, + community	Supporting thinking + learning, individually + collectively	Representing learning
Recognizing	<b>In what ways are youth assets centered and amplified in the lesson, activity, experience?</b>	<b>What routines do we use that regularly showcase youths' and communities' expertise? Interests? Strengths?</b>	<b>What do we know about the youth in our program? How do we seek to learn about and with youth and their families?</b>	<b>How are youth ideas and actions made visible for celebrating as resources? What do we recognize as important?</b>	<b>How are youth supported in sharing what they learn and do in our programs? Through artifacts? Performances? Other?</b>
	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Provide youth with different opportunities to show/share what they know/have learned.</li> <li>2) Conduct community asset mapping to learn more about the people, resources, and contexts that matter to members of the community.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Use a sharing circle to help students recognize each others' assets.</li> <li>2) Inviting youth to write/draw messages they receive about themselves in STEM can create dialogic spaces for sharing stories of symbolic and and epistemic violence experienced in/via STEM.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Remember specifics about each youth that they have shared with you.</li> <li>2) Keeping a diary where we write something special about each youth, each week, can help broaden our view of what counts as expertise and who can be experts.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Regularly ask youth who have experience with a skill related to the day's activities to share their expertise.</li> <li>2) Let youth know what we and their peers recognize as powerful from youths' ideas and actions.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Have youth present work-in-progress to the entire class/group during an end-of-day sharing time.</li> <li>2) Outcomes of science learning could include: community workshops, formation of new social networks, transformation of gatekeepers into allies.</li> </ol>
Re-Seeing and Re-Shaping	<b>How do program experiences offer youth rich opportunities to develop STEM identities and pathways?</b>	<b>How is re-seeing and re-shaping STEM connections a part of our learning community culture?</b>	<b>How do the relationships we have with youth and families support/inform brokering opportunities?</b>	<b>How do we listen to youths' ideas on connections they want to make, and help youth identify resources and next steps?</b>	<b>How do we invite resources, experiences, and people into the learning space (physically or virtually)?</b>
	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Connect youth to learn from each others' different forms of expertise by planning getting-to-know activities that introduce youths' interests, expertise and identities in STEM.</li> <li>2) Include beyond-classroom experiences such as field visit, meeting with STEM experts, or virtual field trips.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) At the start, ask youth to share experiences and knowledge related to daily activities so they can broker their experiences to help peers' learning experience.</li> <li>2) Create ways to maintain a relationship with parents (e.g., in-person, text, call, email) to inform opportunities matching their children's interests.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Ask youth frequently for input on WHAT type of brokering they most need and want from you. (e.g., career ideas, access to summer programs, etc.).</li> <li>2) Keep track of outside experiences, showing youth sustained care and respect ("How did the summer program go?").</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Brainstorm with youth their activity goals and visions. Solicit relevant experiences and assets youth have to enrich learning goals and experiences.</li> <li>2) Identify and invite community members (e.g., teachers, parents) as scheduled visitors to inform youth projects.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Ask expert adult visitors to join group discussions on days of related topics (include parents and other community members as experts).</li> <li>2) Invite community members to events to support connections between community members and youth.</li> </ol>
Co-designing	<b>How are youth involved in designing STEM programs and experiences? What decisions are youth invited to help make related to content and activity?</b>	<b>How are youth involved in shaping norms and routines?</b>	<b>How have we collaborated to build relationships of mutual care, understanding, and respect with youth, their families, and communities?</b>	<b>How have we asked youth how they would like to share and listen to ideas in the group? How have we included those preferences in the program?</b>	<b>How have youth been involved in deciding how to represent their learning?</b>
	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Shared Goal Setting: Ask youth to share their goals for the program (orally, written reflections or quick survey).</li> <li>2) Co-decide what are must-do activities during a unit, and what are fun if-we-have-time ideas.</li> <li>3) Create opportunities for youth to critique what experiences work for them and not, and why.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Co-construct a social contract based on youth assets.</li> <li>2) Co-construct daily routines with youth (ask what they would add or change to the agenda, and why). This can infuse the day with creativity and flexibility! Keeping larger goals visible and shared, but leaving specific openings for choice, allows youth to keep more ownership and agency.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Ask youth which family and community members they would like to share their work/ideas with (and inviting these people to a Showcase) to help in building these relationships.</li> <li>2) Explicitly use youths' ideas to shape activities to demonstrate respect for youth and their experiences/ ideas/ interests.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Do periodic individual check-ins with youth, e.g., ask how they feel heard and how they could better be heard. This could take the form of an individual, informal chat and/or a short survey.</li> <li>2) Ask youth to brainstorm with we to help create more options for sharing their progress, questions, stuck points, and aha moments with we and/or their peers.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Supporting youth in co-designing and choosing how to share their learning: <ul style="list-style-type: none"> <li>-Present a model/diagram</li> <li>-Sing or draw about an idea</li> <li>-Write an explanatory essay</li> <li>-Create a demo of a concept</li> <li>-Create an informative video</li> <li>-Write a letter to a relevant audience</li> </ul> </li> <li>2) After sharing options, open up space for youth to add options too.</li> </ol>
Reclaiming	<b>How do planned activities center youth and showcase youth presence?</b>	<b>How do we set up space for youth to discuss and negotiate norms and routines?</b>	<b>How are youth supported in building relationships of mutual care, understanding and respect?</b>	<b>What opportunities and support structures support youth in sharing their ideas for shaping the educational space?</b>	<b>How do representations of learning help youth shape our space and leave an enduring presence?</b>
	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Ask youth what materials they are missing that could help them achieve project goals. Help them find or problem-solve a way to make those materials available.</li> <li>2) Plan for particular spaces in the room to be claimed by youth as their place to display their work or set aside for activities they see as important can support youth in feeling ownership of the space.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Encourage youth to choose a place on the wall, a shelf, etc. as their own space to store items and/or display work can support youth ownership of the space.</li> <li>2) Have explicit conversations about how youth want to feel and be in our space, and how the space can support it. Discuss how/why current layout/contents of the space open/close feeling welcomed.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Refer to the program space as "our space". Refer to furniture and classroom objects as co-owned, youth-adult shared property.</li> <li>2) Share passwords or keys with youth where possible/appropriate (e.g., designate a specific cabinet or drawer with a lock openable by youth in the program) fosters trust and youth ownership.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Creating a display area in the room can provide a place for youth to share ideas and feel all ideas are welcome. This could be a "rough draft," or "solution in progress" board.</li> <li>2) Create a list of dream activities/materials with youth that can support youth in sharing what they want for the space and feeling they have a say in shaping the space.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Ask youth to represent their learning in a way that can stay in the space long-term, fostering ownership and showing that their learning matters.</li> <li>2) Focusing a project on how youth can solve a problem in a communal space can support youth in actively and positively shaping that space. (e.g., youth survey community asking about concerns/issues, then create solutions).</li> </ol>
Shifting Narratives	<b>How can we use design to challenge dominant, false-normative views, histories, and ways of doing STEM?</b>	<b>How do we seek leadership from youth when establishing group discourse, norms, and routines in programs?</b>	<b>How are we working to honor relationships by amplifying previously-ignored voices institutionally?</b>	<b>How are we supporting student thinking in ways that help challenge who feels like a STEM thinker and doer?</b>	<b>How are we using youth artifacts as an opportunity to support them in shifting narratives about STEM expertise?</b>
	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Consider dominant narratives related to the experience we are designing. Consider who/what's missing and narratives to add.</li> <li>2) Include questions for youth in experience design that ask youth to share their narrative and to question/think about assumptions in their narrative.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Model talk moves that encourage questioning assumptions, listening to and valuing multiple narratives.</li> <li>2) Discuss with youth how they have engaged with STEM, how they would like to engage in STEM, and options for different ways of doing STEM.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Create space for youth to share STEM experiences and to make connections to program experiences.</li> <li>2) Create space for youth to explore and share who matters to them in STEM. Include these people and ways of doing STEM in our program experiences.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Highlight people who do the types of STEM activities we do in our program. This includes STEM professionals from many races/ethnicities, genders, countries, as well as cooks, gardeners, etc.</li> <li>2) Discuss multiple ways to engage in STEM both professionally and in daily life.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Take inventory of how youth are currently represented in our program space. Reflect on who's missing, and why.</li> <li>2) Seek opportunities to highlight youth from communities not typically celebrated in STEM. Invite youth to share ways they'd want to have their work noticed publicly.</li> </ol>
Critically Being With	<b>How do our learning experiences and spaces encourage (or inhibit) youth abilities to be present in the moment?</b>	<b>How do we schedule time to be present in the moment together and validate each other? How can we check in during programs?</b>	<b>How do we invite youth, and their families and communities, to share in our day and our life, or their day/life with you?</b>	<b>How do we ensure that youth ideas are heard and carefully considered by you, and by them/their peers?</b>	<b>How do we invite youth to share their learning work and moments-of-discovery with others?</b>
	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Take a "sensory inventory" of the learning spaces to pinpoint often-overlooked stimuli that could become bums or distractions for youth (e.g., machinery droning, hohum color schemes, etc.).</li> <li>2) Ask youth to do a sensory inventory. Combine data and brainstorm solutions together to improve the learning space.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) 5-minute start-of-session sharing times can open up spaces for being together with youth. This could also be co-led by youth!</li> <li>2) Use student- and teacher-talk moves that routinely incorporate mindful presence ("How do we all feel about that idea? Why do we feel or think that way?").</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Add a reminder to lesson plans to regularly talk about goals (e.g., with start-of-class sharing time prompts). Take note of youth's thoughts about activities.</li> <li>2) Hold space to discuss youth thoughts and perspectives, including on difficult topics (e.g., make space to critically discuss uses of technology to unjustly target communities of color).</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Make time for youth to reflect together and express their thinking to each other (e.g., Think-pair-share, index cards/post-its on a poster).</li> <li>2) As a way to become more present in each other's thinking together, ask youth to discuss how they see connections between peers' ideas and experiences in the program and daily life.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Make pockets of time for youth to reflect on their STEM learning experiences in-the-moment with we and other youth.</li> <li>2) Model questions to ask (during end-of-day youth report-outs) to support youth critical reflections (e.g., a challenging thing I did, high and low moments, curious questions lingering from today's experience).</li> </ol>
Embracing Humanity	<b>During design processes, who do we include, and who might be left out?</b>	<b>How can our STEM space create a culture in which youth express their humanness and feel included as who they are?</b>	<b>What could it mean to relate to youth as fully human in STEM learning spaces?</b>	<b>How have we listened to and carefully considered ALL youth ideas?</b>	<b>When planning showcases, who is explicitly invited and who's accidentally left out? Who is hosting or directing presentational forms?</b>
	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Plan activities that support youth in sharing knowledge from their lives, and position youth as leaders/teachers.</li> <li>2) Create opportunities that value youth for who they are and their experiences.</li> <li>3) Include youth as valued co-planners of experiences.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Co-construct an "assets-based social contract" oriented towards embracing youths' lives and justice within and beyond the learning community.</li> <li>2) Create new roles that position youth to share their expertise.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Create group reflection time that centers youths' experiences, including their feelings about their STEM experiences.</li> <li>2) Create spaces to learn more about youths' personal interests, motivations and experiences.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Create a Help Board where youth add their questions and answer peers' questions to support expertise sharing.</li> <li>2) Use talk moves that elevate and value youths' contributions.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Set aside end-of-day "showcase time": Provide youth with space and time to share what they have created and learned that day.</li> <li>2) Allow for multi-modalities in representations of learning, providing youth with choices in their modalities.</li> </ol>
Authority Sharing	<b>How are youth encouraged to enact authority in our learning space? Do youth have opportunities to showcase expertise?</b>	<b>Who decides the norms and routines in our programs? What roles do youth play in these norms and routines?</b>	<b>How would we describe your relationships with youth and their families? What are the relationships based upon?</b>	<b>How are youth supported to leverage assets towards learning? How do we create space for them to try out new ideas?</b>	<b>What does it mean to be a successful science learner in our program?</b>
	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Consider "designing for joy" in STEM. Consider inviting youth or community members to "co-plan for more joy" in program activities, bringing in different cultural ideas and perspectives.</li> <li>2) Consider hosting colleague co-learner workshops using cases of incorporating youth interests and cultures in program designs.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Create spaces/routines (physical or social) for youth to engage in projects they love, take a break when they need to, and reflect (e.g., a "chill zone" corner).</li> <li>2) Start the day with space for youth to share feelings. (e.g., a quick thumbs up/down/sideways, time to share with you/group, etc.) Model active listening and supportive responses.</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Put yourself in the youth's position to resonate with an array of feelings youth may experience by engaging in our STEM program.</li> <li>2) Being open to expressing our own vulnerability can show youth that we are open to recognizing and connecting with their humanity (e.g., joy, frustration, sleepiness, fun).</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Spend moments with each youth as we walk around the room. Ask how they think about the ideas and how they are drawing on their available resources and expertise.</li> <li>2) Provide youth with a variety of ways to share their ideas to support everyone in hearing a variety of ideas, not just from extroverts (e.g., small group work, write ideas down, etc.).</li> </ol>	<p><b>Options to consider:</b></p> <ol style="list-style-type: none"> <li>1) Return to the group's co-constructed social contract as needed, continually and kindly reminding all youth that every single individual's contributions are valid and valuable.</li> <li>2) Storytelling is an effective form for bringing audiences on learners' human journey of learning, doing, struggling, and succeeding!</li> </ol>