



Supporting Ethical Sense- making & Expansive STEAM Learning

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In Collaboration with the Vossoughi Research Lab

What Do We Mean By Ethical Sense Making?

Just as we engage in mathematical sense making when practicing or learning how to do math, we engage in ethical sense-making when practicing or learning what is good or right or true. It's a way of being and thinking that we learn from and with others, and that requires practice. As educators we can recognize that ethical sense-making is happening all the time and across every discipline, and we can learn to meaningfully support it in our learning environments.

In this zine, we want to share some rich examples we've studied and learned from of young people and educators engaging in ethical sense-making together. In sharing these examples with you, it's our hope that we can collectively learn something about what ethical sense-making looks like when it happens in making/STEAM spaces and programs, how we can support it when it does happen, and the kinds of possibilities for collective learning that are opened up when young people's ethical thinking is seen, supported, and taken seriously.

Big Ideas of the Zine

People are practicing ethical sense-making all the time (whether we recognize it or not), and it is something we learn to do.

Treating ethical questions and statements as moments of ethical meaning-making in process opens up opportunities to support young people in their learning and becoming as social thinkers and actors.

Educators can support more complex and nuanced ethical sense-making by modeling those practices with young people across disciplinary domains and everyday interactions.

Opening up what kinds of disciplinary practices matter and how they matter also supports young people in thinking about the ethics and social implications of what they are doing and creating, practicing ways of knowing that support social and ecological justice.



Our Learning Environments

The examples we draw on for this zine are from two making and tinkering spaces:

The STEAM Experience

A making and tinkering summer program in the Midwest that served incoming black and latinx 6th graders. Over the course of 6 weeks, makers engaged in various making practices, formed teams, and developed an ios app to solve a problem they identified in their own communities.

Tinkering After School

The Tinkering Afterschool Program (TAP) was a partnership between the Boys and Girls Clubs of San Francisco and a local science museum. Participants included black, latinx and asian american children (k-5) and youth educators (ages 15-20) working alongside adult educators from the museum and clubs. In a weekly workshop setting, participants engaged in STEAM activities such as circuit boards, marble machines, sun prints and the creation of music instruments.



What does ethical thinking look like in a maker space?

Ethical thinking can look a lot of different ways and can sometimes be difficult to notice. Yet, people are engaged in ethical thinking and decision-making all the time.

Here are a few examples :

Students are working on designing an app and are trying to make sure it will be accessible to people in their communities.



A Black young person asks if it's okay to make things specifically for Black people.

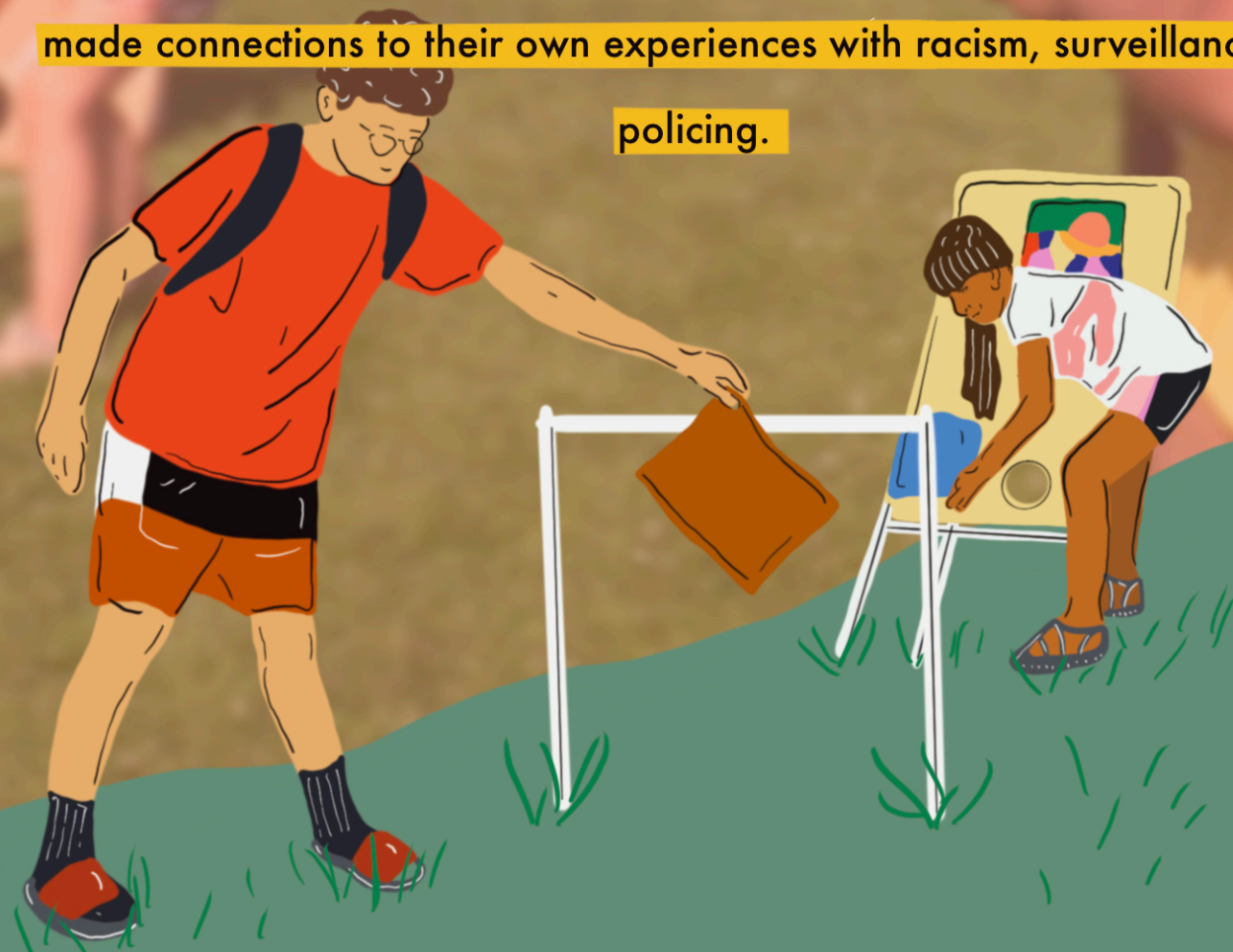
A young girl is thinking about how the things she's learning to make are similar to things her mom makes.



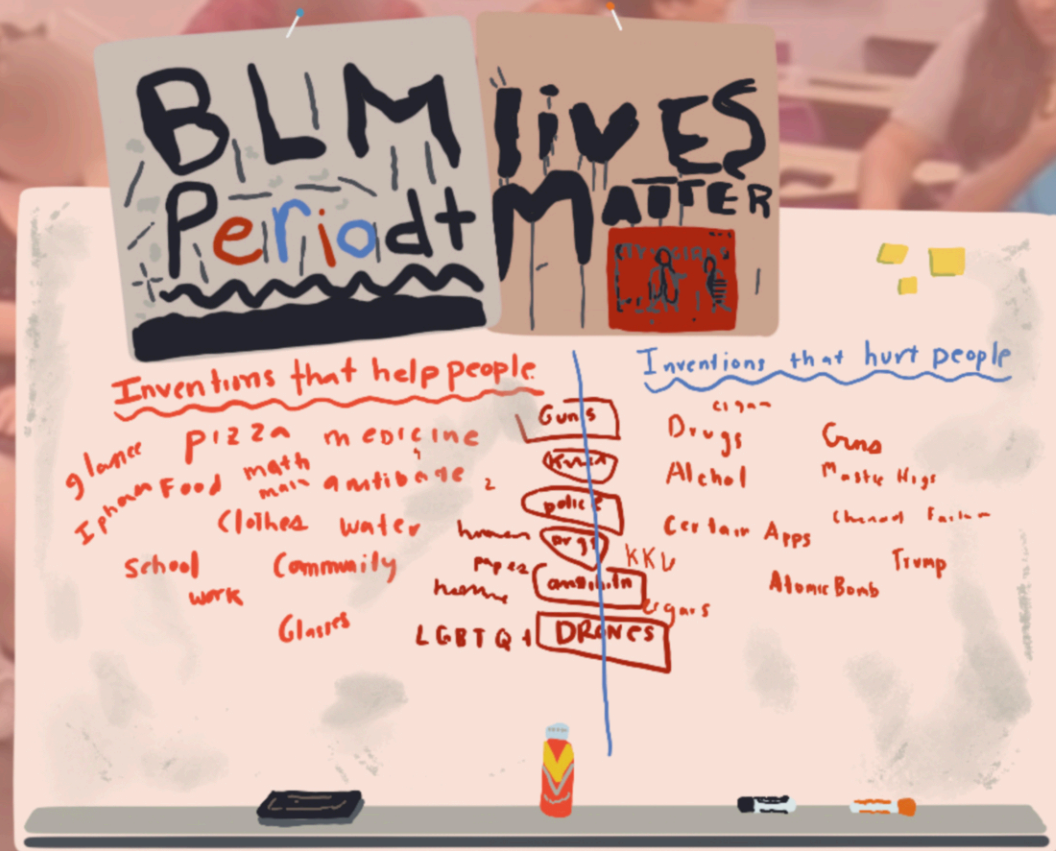
A group of young people are flying remote-controlled drones through an obstacle course.

Let's take a closer look at this example

Mentors in the STEAM Experience led an activity where kids grouped up to build an obstacle course that they then competed flying remote-controlled drones through. Mentors were uncomfortable with how they positioned the ethics of drones in this activity, and so the next day led a whole group activity about how inventions can both be fun and help people and also cause harm and hurt people. In this activity, they focused on the US's use of remote drones to drop bombs and engage in warfare in the southwest Asia and other parts of the world. Mentors also shared the example of an Afghani inventor, Massoud Hassani, who is creating a wind-powered machine that removes land mines. Young people in the space engaged dynamically in this activity and made connections to their own experiences with racism, surveillance and policing.



When young people are playing with drones as toys, they're also thinking and learning about the ethics of drones, including ideas such as: drones are fun, they are toys, and they are harmless. Drones can become conceptualized as harmless inventions disconnected from their broader politics and ethics. This becomes more obvious in contrast to the type of dialogue that emerged in the program, which focused on how inventions can both help and hurt people:



The ethical thinking and learning young people were already doing became more visible after educators supported and recognized the need for critical reflection. Educators challenged the idea of drones as innocent inventions by supporting youth in thinking through their ethical complexities, alongside a broader discussion of inventions that are helpful, harmful or both.

What are some moments of ethical thinking you have noticed in your own educational settings, and in everyday life? What did it look and feel like? Was it difficult, at first, to see?



Now that we have an idea of what ethical thinking can look like, let's turn to look closely at two examples of educators and students engaging in ethical thinking together. We are interested in highlighting how educators can support ethical thinking and the possibilities for social thought + action this can open up within and beyond our learning environments.

Critical thinkers ask:

1. How do we...?
2. ...?
3. ...?
4. ...?
5. What are the other possibilities for the world... [your Apps]

Recognizing Young People's Questions as Opportunities for Ethical Meaning Making

Our first example considers a student-initiated discussion on the politics of making an app for Black people. During a discussion about app design and how each group's app would function Aaron (a Black educator and artist in the space) asked:

"I would still like to hear your issues...what kind of app are you all going to make?" A student said that her group's is focused on "black beauty." Aaron asked about the app and how he could use it. Students talked about things like hairstyles. **Dominique asked: "What if white people want to shop there? What if ms. Sara want to shop there?"** There was some laughter from the group and a serious discussion ensued about race, power and exclusion versus creating spaces for a particular group. Someone said, 'that's just the name of our [app].' 'it's just for black people but it doesn't have to be just for black people.' 'other races can wear it.'

In this exchange, Dominique expressed concern about whether Sarah—a white woman mentor whom a lot of people in the program were close to—and other white people would be able to use the app. In response, other students assured Dominique that white people and people of other races can use the app.

Before reading on, how would you respond to Dominique's comment?

Some ways an educator might respond to Dominique's question:

- Seeing Dominique's comment as repeating conservative talking points and dismissing or correcting her
- Deciding Dominique's question was addressed by students and they could move on with the lesson.
- Considering the conversation as off-topic because it's not about app design

Aaron's response:

Aaron said, "Also here's the reality. When it comes to talking about race and our marginalization in this country. Like it's ok for us to have a space that says, you know, we're not excluding white people...people of color deserve to have their own space." Some students pushed back on this and Aaron posed the question 'if that's the case, why do we have Black Lives Matter and not all lives matter?' A student said, 'cuz we had 400 years of slavery...' 'white people and other people had a better resources and we had 400 years of slavery and segregation and they didn't have that. But like all lives do matter but black lives...' Someone else said, 'black lives do matter more.' There was some additional discussion here.

Aaron intervened, "As far as like space. When you're dealing with a situation where a group of people are being targeted and having a lot of negative things. It's ok to have a positive space for something. You're not excluding other races. Black lives matter doesn't exclude other races, we're just like focusing on ourselves."

After reading about Dominique's concern and Aaron's response, What do you notice?

- What specifically does Aaron do in this excerpt that supported Dominique and others in thinking about the ethics of the Black Beauty app?
- What are some ways of reading what Dominique was wrestling with that help create responses like Aaron's?
- How else might you respond?



One thing our research and teaching has taught us is the importance of responding to young people in ways that approach their ethical thinking not as finished, but as always still in-process.

Aaron could have responded by dismissing Dominique's thinking as repeating conservative talking points. Instead, he recognized this as a moment in which Dominique was deeply concerned with what it means to make an app that only Black people could use, and whether Sara, a white person she cares about, would not be allowed to use the app.

Dominique was wrestling with a deep and principled ethical analysis. Aaron responded by approaching her thinking not as repeating oppressive talking points, but as a moment in which she was trying to make sense of the ethical meanings of her app. Recognizing her thinking as in-process he provided pedagogical support for an alternate ethical framework: one that's not about narrow notions of inclusion and instead centers Black people and people of color as taking care of and focusing on their own communities.

"Like it's ok for us to have a space that says, you know, we're not excluding white people...people of color deserve to have their own space."

Validating the student's concern and recognizing that this kind of ethical questioning is an appropriate practice in app design.

"...if that's the case, why do we have black lives matter and not all lives matter?"

Supporting by offering examples students are familiar with

"When you're dealing with a situation where a group of people are being targeted and having a lot of negative things. It's ok to have a positive space for something. You're not excluding other races."

Offering and explaining an alternative way of thinking about the ethics of an app designed for Black people.

"Black lives matter doesn't exclude other races, we're just like focusing on ourselves."

Orienting around their own collective needs and goals.





Opening Up What Matters

The final example we want to share is from the Tinkering Afterschool Program. Read the story across the next few pages and consider the following questions:

- Where do you see ethical thinking happening in this excerpt? What does it look like? (Feel free to mark up the page/transcript!)
- What do you see Shirin doing to support ethical thinking?
- What other fruitful responses can you imagine in a moment like this?

One month into Stefanie's participation in the program, we were taking apart old machines to investigate how they worked, when Stefanie reflected on 'science night' at the Boys and Girls Club a few weeks prior. Science night included numerous presentations by local groups, one of which focused on promoting girls and women of color in science. As part of their introduction, two Black women wearing white lab coats and goggles demonstrated an experiment that included sticking a long needle through a balloon. As Stefanie and Shirin worked to unscrew the lid of an old answering machine, they had the following exchange along with Shauna, another seven year old:

Shirin: You got it, keep going.

Stefanie: Still it doesn't feel like science.

Shirin: It doesn't feel like science? How come you think it doesn't feel like science?

Stefanie: It doesn't have any like um science stuff.

Shirin: What is science stuff, you think?

Stefanie: Like making a balloon, like putting a – [gesturing a needle through a balloon with her hands]

Shirin: Needle through a balloon. Like at that one science night?

Stefanie: Yeah.

Shirin: Have you ever dissected an animal?

Stefanie: What's that?

Shirin: Like when you open up an animal and go inside to see its guts.

Shauna: Ew No.

Stefanie: No – Yeeess.

Shirin: Have you seen people do that? Or have you done that?

Stefanie: My, my mom and dad do that. . .

Shauna: Some people do that when they want to get a turkey for Thanksgiving.

Shirin: That's right. That's sometimes for cooking reasons.

Stefanie: My mom usually does that with um, what's it called?

Shauna: But I have touched the brains before of animals.

Shirin: Which animals?

Shauna: I don't remember. And I've touched a horse skull.

Shirin: Whoa! [Turning back to Stefanie] You were saying about your mom. . .

Stefanie: Yeah, she like takes out all the organs of a [chicken].

This example is drawn from the following paper: Sengupta-Irving, T., & Vossoughi, S. (2019). Not in their name: re-interpreting discourses of STEM learning through the subjective experiences of minoritized girls. *Race Ethnicity and Education*, 22(4), 479-501.

Noticing and wonderings...



What we want to focus on in this example is how opening up what counts as science, where science happens, and who counts as doing science also opened up new ways in which Stefanie made sense of the value, goodness, and rightness of what she was doing.

- At the beginning of the excerpt, Stefanie expressed that what they were doing didn't feel like science. Shirin asked questions to better understand Stefanie's thinking. She also tried to make the science visible by framing their activity (taking apart an old machine) through another, perhaps more recognizable, scientific practice (dissecting an animal).
- While Shauna initially responded with "Ew no," Stefanie recognized Shirin's description in the practices her parents engage in around cooking at home. We recognize this connection as supported through Shirin asking "Have you seen **people** do that?" Rather than immediately connecting science to the work of "Scientists," which might have foreclosed the space for Stefanie to make the connection to practices within her family. Shirin followed her lead and validated cooking as tied to the forms of science they were discussing.
- Stefanie's introduction of cleaning an animal for cooking reasons and Shirin's affirmation of this connection as a legitimate way of thinking about what they were doing opened up new ways for the students to relate to and value their activity, and the activity of their family members, reframing where science takes place, and who engages in it. There are also a few ways to interpret Stefanie's final use of the word 'organs' (In contrast to Shirin's use of the word 'guts') that are not trivial. Stefanie can be seen as storying her parents' activity in 'scientific' terms, perhaps taking up Shirin's invitation to locate science beyond the lab. She was also amending Shirin's phrasing to take a respectful stance towards more-than-human beings, a potential link to relational (rather than hierarchical) human-nature relations common within Indigenous epistemologies of science.

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Shirin: It doesn't feel like science? How come you think it doesn't feel like science?

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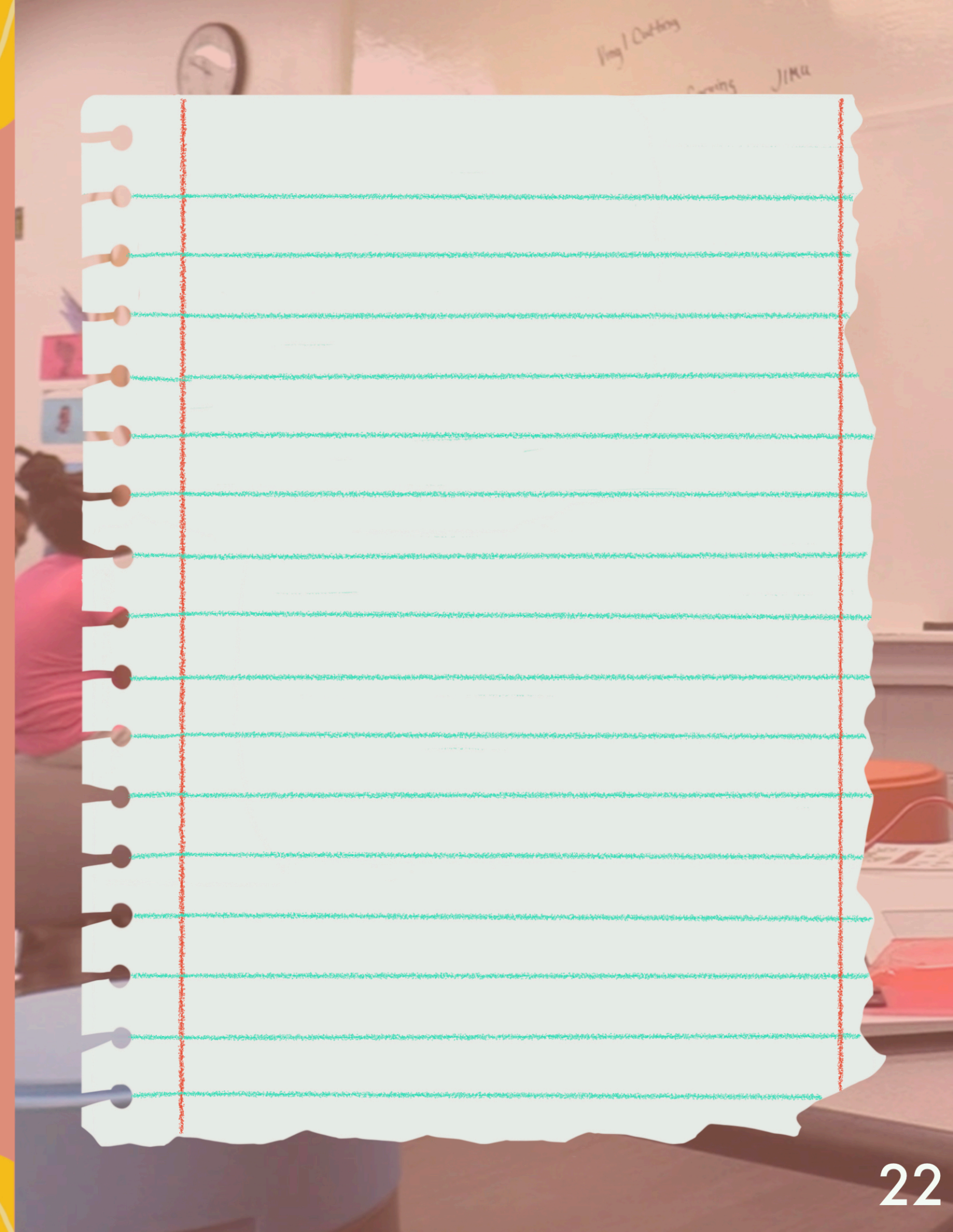
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Debrief Questions

- How are you reflecting on moments when it felt like young people were thinking about the goodness or rightness of what they were doing?
- What are some similar moments that you recall from your space?
- What are some ways of responding and thinking with students that you'd like to try out based on these reflections?
- What new questions are coming up for you about supporting ethical sense-making in your context?



Ideas for Professional Development

This page offers some ideas about how this zine could be used as part of a professional development workshop or ongoing training for educators.

Act it out!

Examples in this zine lend themselves to being acted out or performed. Ask volunteers to use the transcripts to speak/act out an example. Reflect on what they notice differently through performing (or watching a performance) versus reading, as well as what it felt like to be each "character."

Alternatively (or in addition), invite educators to improvise and make changes to the transcripts as a practice of revising, riffing, and imagining alternate pedagogical possibilities.

Design

Where are implicit or explicit opportunities for ethical sense-making within your curriculum and activities? How can you iterate on these to expand opportunities for shared thinking and learning?

Generate and workshop examples from your own practice

Bring in recent activities or events that happened in your learning spaces as more familiar contexts that educators can use to think about what supporting young people's ethical thinking looks like. Similar to the above, these can be acted out and worked on collectively to imagine a range of meaningful responses and ways of organizing co-thinking and learning.

Debrief

To support the ongoing growth of pedagogical practice, develop ways of routinely noticing, journaling about and discussing moments of ethical sense-making when they arise.

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Some Additional Resources:

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