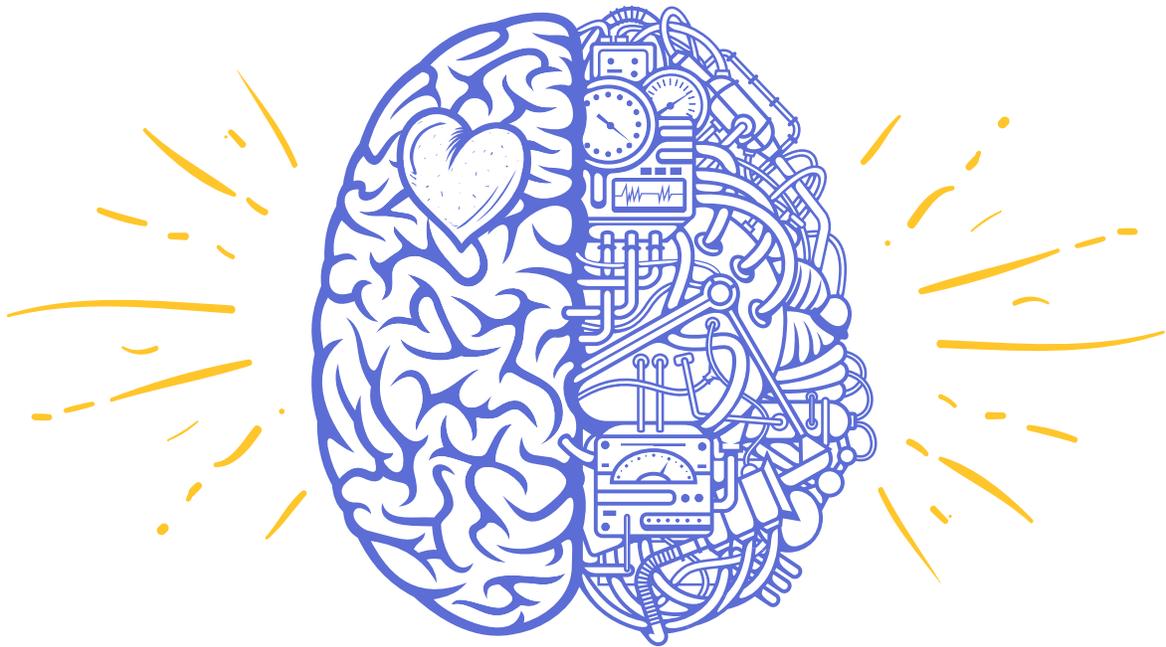


CULTIVATING A REPAIR MINDSET



IN THE K-12 SETTING AND BEYOND

DOWNLOAD THIS RESOURCE AT [HTTPS://RESOURCES.MAKERED.ORG/](https://resources.makered.org/)



@MAKERED @ABDOAKLAND #REPAIRMINDSET

How it Started

In the spring of 2018, Vita Wells, founder of The Culture of Repair Project, walked into the Agency *by* Design Oakland Maker Bar at Oakland International High School. She came prepared—with a plethora of notes about the relationship between Making and Repairing, and a well-read copy of [Maker-Centered Learning: Empowering Young People to Shape Their World](#), the comprehensive book from Project Zero's Agency *by* Design research project. We left that meeting inspired by each other's curiosity. We wondered:

Where might repair show up in the curriculum or the school day? How do we ignite an interest in repair in the K-12 classroom? How do we help young people cultivate a mindset of repair? How might the Agency *by* Design tools be adapted to support repair specifically?

Keenly interested in addressing those questions and more, we started a grants program and a research project. Through that work we've learned a lot about the synergies between Making and Repairing. In 2019 Maker Ed joined us as we gathered a working group of Bay Area educators (more about us on page 30) to consider how to cultivate a Repair Mindset in the classroom. What emerged was this toolkit, which includes essays as well as concrete tools.

Early on we noticed how broad repair is and how much it's needed, everywhere. We see it in our politics, in the social fabric of our communities, in the environment, and on and on. As educators we see it inside public schools—in the omission of histories, the compliance demanded by oppressive power structures, and in the harm caused by well meaning teachers, even ourselves, who strive to be anti-racist but fumble and need to attend to the impact. The need for repair between people speaks deeply to us. We look at systems and the interconnectedness of everything as a generative starting point, but we knew we needed to narrow in. Objects from everyday life are a cognitive gateway to exploring systems, and learners love to get their hands on them, so we decided to start with the concrete. As you invite your students to look at and repair objects, we urge you to look for opportunities to cultivate their thinking about systems by exploring what the design of an object tells them about the systems shaping our lives, and to consider how they might repair those systems.

This project would not have been possible without Vita's persistence about seeing the intertwined nature of Repair and Making. Her intellectual curiosity and challenging questions awoke our own engagement with repair. We are grateful for this gift and the time to consider such a complex and elegant topic.

Brooke Toczylowski, Co-Director, Agency *by* Design Oakland

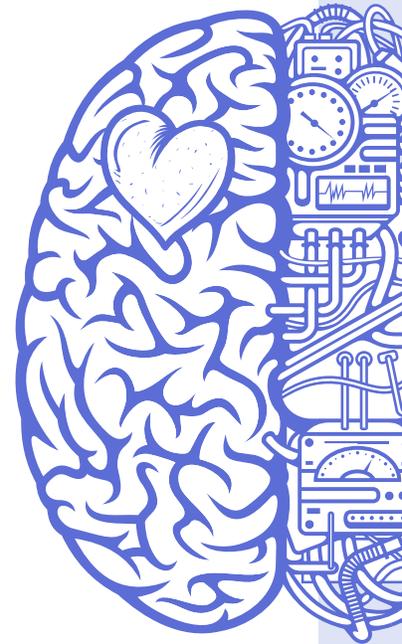
REPAIR + MAKER-CENTERED LEARNING

When I approached Brooke in 2018 I was quite clear on how Maker-Centered Learning (MCL) would benefit from integrating repairing objects into the program.

What I didn't see yet was how the encounter with MCL would enrich and broaden how we think about repair, and how we cultivate a world that not only repairs our objects, but also the systems that shape our lives. Human beings, and what we make and do, are imperfect. But even as our world is rife with flaws, fractures, cracks, tears and all manner of breakages, it is yet more deeply characterized by an inclination to heal, to reconcile, to regenerate – in short, to repair.

I saw this inclination in working with the outstanding educators from Agency *by* Design Oakland, Maker Ed, and the Oakland Unified School District. I see its expression in this publication. And I see its promise: these materials will be further developed and deployed to repair our world, toward not only the well-being of all people, but also of the earth itself and the life it supports.

Vita Wells, Founder of The Culture of Repair Project



**THIS PROJECT AND TOOLKIT
WAS MADE POSSIBLE BY
FUNDING FROM THE CULTURE OF
REPAIR PROJECT**



Project Leads

Brooke Toczyłowski, Aaron Vanderwerff

Working Group

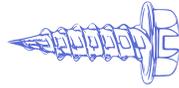
Reina Cabezas, Paula Mitchell, Ngà Nguyễn, Brooke Toczyłowski, Aaron Vanderwerff, Susan Wolf

Designed by

Bri James

Contributor & Editor

Justin Boner



WHY WE CREATED THIS TOOLKIT

Repair offers a multidimensional lens through which to view and experience making. This toolkit is both a sharing out of our research work and an invitation to engage in the richness of repair, both at home and in the classroom.

WHAT TO EXPECT

IN THIS TOOLKIT YOU WILL:

- Explore key concepts.
- Try out thinking routines aimed at building sensitivity to how objects are designed and how to repair them.
- Develop your own relationship to repair.



TABLE OF CONTENTS



KEY CONCEPTS

What is Repair?	5
Our Repair Stance	6
Repair Mindset	7
The Disposition to Care for and Repair Objects	10
The Relationship Between Repair and Making	11

TOOLS

Repair Zine	17
Repair Exploration	19
Parts, Perspectives, and Me	21
Repair Journal	23
Resources & References	27
Appreciations	29
Who We Are	30

WHAT IS REPAIR?

DEFINITION OF REPAIR* ~ transitive verb

1a: to restore by replacing a part or putting together what is torn or broken : **FIX**

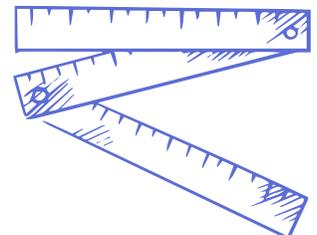
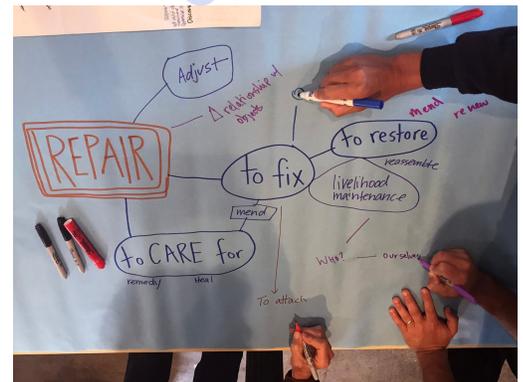
1b : to restore to a sound or healthy state : **RENEW**

2 : to make good : compensate for : **REMEDY**

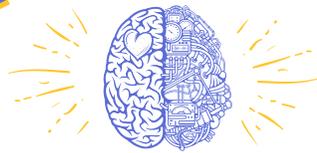
*Sourcing: Merriam Webster

Since 2019 Agency by Design Oakland and Maker Ed have partnered with The Culture of Repair Project to consider how to ignite an interest in repair within maker-centered learning and the broader K-12 landscape. Among the many research questions we asked we found ourselves coming back to basics, asking time and again, “*How are we defining “Repair”?*” This question is rich with complexity. Is repair about fixing an object back to its original state—restoration? Is it about repurposing parts to make them useful and turn them into something new? Or, is repair about justice, healing relationships and fixing the many broken systems around us? Our working group, a collective of six educators with different backgrounds, content expertise, and contexts, has explored this topic and how it might impact K-12 education. We chose to begin our focus on the repair of physical objects. We believe that repairing objects sets off a chain reaction that is part of restoring the many systems to which each object is connected, and that the object and system are interdependent and interconnected.

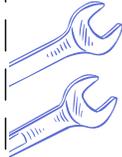
Working Group members collaboratively define repair, based on our various perspectives and experiences.



OUR REPAIR STANCE

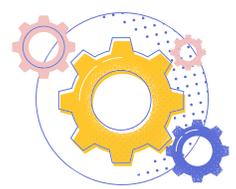


There is a worldwide movement to Repair and we bow to their expertise and beliefs. We notice, that as educators and activists, we have additional ideas to contribute, in our own words.



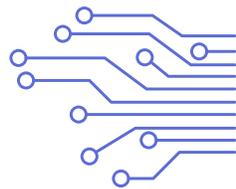
We believe that because everyone is a maker everyone is also a repairer.

We value the complexity of repair and the potential it holds to both understand and shift power, culture, and ways of knowing and being.



We recognize that we need to learn and teach a new ethos of materials, manufacture and consumerism because of its impact upon the lives of our students and our planet.

We value repair and understand that access to tools, raw materials, a workspace and time are real life constraints and often contribute to why repair does not happen when it could have.



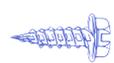
We value the community effort that supports a disposition of repair.



We believe that to make, mend and repair is non-gendered.



We strive to continue to learn how to hold community values that recognize and attempt to break from the norms of consumerism and instead prioritizing care and/or interactions with the living world.



We support the right to repair movement, and advocate for design that values hacking and fixing as well as product guides, instructional videos, and replacement parts.

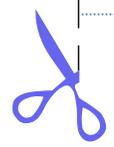


This work is inspired by IFixit's Repair Manifesto which provides purposeful language for why to repair.

Their thinking inspires us!

Learn more at <https://www.ifixit.com/>

To print this poster on its own download at <https://bit.ly/RepairStance>



Share your experience with this tool on social media using the hashtags #RepairMindset and #MakerEd

REPAIR MINDSET

By Aaron Vanderweff and Paula Mitchell

What does it mean to have a repair mindset? And what does it look like in action? Two short anecdotes below, which both occurred in public schools in Oakland, CA, help shed light on these questions.



SETTING ONE'S MIND ON REPAIR

BACK TO SCHOOL

At an annual back-to-school night, in a classroom packed to the brim with parents and caregivers, a classroom teacher shares an overview of the upcoming year's curriculum, aspirations, and expectations. As a brief aside, the teacher asks: "Does anyone know how to fix a portable CD player? Mine isn't working properly." The immediate and nearly unanimous response from the seated parents resounds: "Just buy a new one!"

GLORIA'S REPAIR

During a hands-on take-apart activity at Grass Valley Elementary, second grade students are looking closely at a variety of broken objects. One pair of students, Gloria and Nick, pick up a toy cell phone which had already been pulled apart. Gloria smiles, expressing delight and fascination at the maze of electronic components making up the inside of the toy. She then spots, amidst the pile of other objects, a Chromebook that won't close all the way. Returning to her partner with the computer, they both start to explore. Gloria uses a nearby screwdriver to remove over half of the screws from the backside of the computer. The teacher, excited by Gloria's initiative, asks the pair what they think is wrong with the Chromebook. Gloria shares that she notices how one plastic piece in the back of the now open computer sticks up differently than a similar piece on the other side. Before the teacher can respond to this observation, Gloria takes the back of the screwdriver and pushes the plastic piece back into place. Sure enough, when the students screw the backside cover back onto the computer, the Chromebook now closes without a problem.

These two accounts share common terrain. Both involve broken objects: in one, a portable CD player that isn't working the way it usually does and in the other, a Chromebook that won't shut properly. Yet each represents almost opposing attitudes, orientations, and responses to those broken objects. In the first account, while the classroom teacher possesses a desire to fix their defective CD player, the parents in the room express a strong inclination to replace rather than repair it. In the second account, the young second-grader Gloria is intrigued by the broken Chromebook, investigating the source of its defects, and eagerly attempts (with success) to fix it.

THE DRIVING QUESTIONS BEHIND OUR WORK ARE: WHAT CHARACTERIZES A DISPOSITION TOWARD REPAIR? AND HOW CAN WE CULTIVATE A DISPOSITION OF REPAIR, LIKE THAT WHICH GLORIA EPITOMIZES SO POWERFULLY?

Dispositions lie at the heart of our Culture of Repair Working Group’s inquiry. To help us understand how dispositions operate and to support us in identifying and describing the disposition of repair, we’ve drawn on insights offered by the Triadic Theory of Dispositions (Perkins et al. 1-21). Developed by Project Zero researchers, one of whom led the Agency *by* Design research project, this theory posits that all dispositions involve three separate but necessarily interrelated components: **ability, inclination, and sensitivity**. Ability is the possession of the means or skill to do something; inclination is a motivation to invest effort in an activity or thinking; and sensitivity is how likely a person is to notice when they will use a specific way of thinking or doing. Dispositions occur “when these three concepts coalesce - the capacity to do something, the motivation to do it, and the sensitivity to appropriate occasions to do it” (Clapp et al. 104).

This frame has allowed us to develop our own set of indicators for the key abilities, inclinations, and sensitivities that characterize a disposition to care for and repair objects. These indicators, detailed below, support us not only to identify this disposition whenever and wherever it is at play but also to cultivate and nourish it into a strong stance people take when interacting with objects and systems in the pursuit of creating more ethical and just worlds. We hope these indicators empower educators, in particular, to recognize and facilitate a repair mindset in themselves and their learners.



WHAT ARE SOME INCLINATIONS OF REPAIR?

We’ve already caught a glimpse of some key inclinations toward repair in the anecdotes at the start of this essay. When the classroom teacher in the first vignette asks the crowded room for assistance and know-how in fixing a broken CD player, they are expressing a desire to make something work again, starting out from a desire to repair. The parents in the episode do not possess that inclination. When Gloria in the second vignette investigates the cause of the Chromebook’s faulty closing, she is acting on an inclination to make the laptop whole and work again. Other inclinations for repair involve the urge to care for objects, the tendency to value objects and see what others value, and the drive to intervene in an object’s expected lifecycle.



Abilities to repair are often easier to spot or assess than inclinations and include not only the know-how and skills to use tools and materials to fix something - the very competencies which the classroom teacher in the first story was seeking - but also the ability to problem solve with what is available, like when Gloria improvised with the butt of the screwdriver to push some bent plastic back into proper alignment. Gloria's teacher showed us another ability in the realm of repair, the ability to create time & space to care for objects, an ability inherent in the design of the take-apart activity the second-graders were participating in. Other related abilities include the ability to look closely to identify areas of repair and to source parts and knowledge necessary for accomplishing repair. It is this take-apart activity, after all, that paved the way for Gloria to develop a sensitivity to repair.

The key abilities and inclinations described above don't constitute a disposition of repair unless complemented by certain sensitivities to opportunities to repair. These sensitivities can include the following: awareness of the possibility of repair and the possibility of a divergent repair; noticing the connection to cultures of repair (elders, other times, places, people); and more, which are listed on the following page.

WE BELIEVE THAT A REPAIR MINDSET ENABLES AND EMBOLDENS PEOPLE TO CARE MORE DEEPLY ABOUT THE WORLD, THE PEOPLE, THE OBJECTS, AND THE SYSTEMS IN WHICH WE'RE ALL INTERCONNECTED.

When someone displays the inclinations, abilities, and sensitivities described above, in concert, we say they have a repair mindset. We believe that a repair mindset enables and emboldens people to care more deeply about the world, the people, the objects, and the systems in which we're all interconnected. On a concrete level, having a repair mindset inclines people to disrupt the cycles of mass-consumption and waste which tax the earth and harm the delicate ecologies that make life flourish. And on a general level, having a repair mindset motivates people to create sustainable futures and relationships, honoring the world as a place full of possibility.

THE DISPOSITION TO CARE FOR AND REPAIR OBJECTS

This list was developed over multiple sessions of the working group, before, during and after hands-on repair.

KEY INCLINATIONS

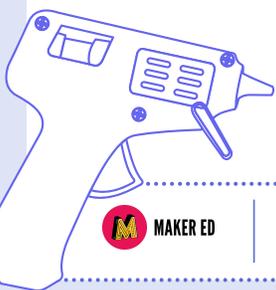
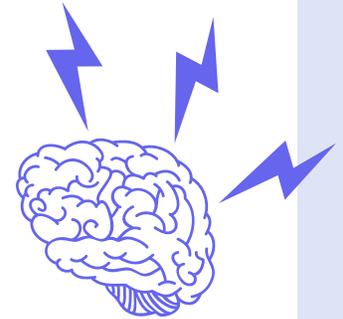
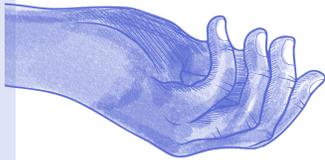
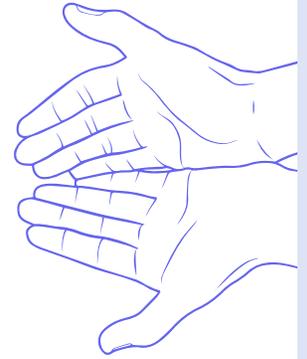
- The urge to care for objects;
- The urge to make things whole;
- The desire to make things work again;
- The tendency to value objects and see what others value;
- The reflex to repair before replace;
- The drive to intervene in an object's expected lifecycle.

KEY SENSITIVITIES

- Awareness of the possibility of repair, whether for original use, for a new use, or for entirely novel purposes (such as aesthetic purposes);
- Alertness to the need for assistance in order to repair;
- Noticing the connection to cultures of repair (elders, other times, places, people);
- Noticing connections to the past, present and future;
- Awareness of the availability of and access to resources;
- Alertness to the impacts of lack of maintenance;
- Awareness of opportunities to care for objects;
- Awareness of how repair is active resistance to consumption;
- Awareness of the inherent limits and fragility of the objects, systems, and worlds we inhabit; and, coupled with that,
- Awareness of the inherent hope and sense of possibility that underlay the day-to-day work done to maintain those objects, systems and worlds (in other words, "broken world thinking" (Jackson, 221).

KEY ABILITIES

- The ability to look closely to identify the area of repair;
- The ability to use tools and materials to repair, to problem solve with what is available, and to troubleshoot;
- The ability to source parts and to source knowledge;
- The ability to create time & space to care for objects.



Share your experience with this tool on social media using the hashtags #RepairMindset and #MakerEd

For more resources visit: <https://resources.makered.org/>

THE RELATIONSHIP BETWEEN REPAIR & MAKING

By Brooke Toczylowski



Author & Working Group member Brooke Toczylowski explores how she might repair a personally meaningful object, her Birthday dress. She used Agency by Design's Parts Purposes Complexities routine to look closely at the ripped armpit, the area in need of repair.

The authors of Maker-Centered Learning: Empowering Young People to Shape Their Worlds illustrate maker empowerment with a story of a young person who learns how to fix his beloved backpack. In this story, Jimmy covets his backpack, which was given to him by his father and which travels with him everywhere. With all sorts of patches and customizations, Jimmy expresses important aspects of his interests and identity on this backpack. When the zipper to the backpack eventually breaks and prevents the pack from closing and, therefore, from functioning, Jimmy sets out on a quest to repair it, making multiple attempts along the way before discovering, after some internet research, how to successfully sew on a new zipper (Clapp et al. 85-87).

It is significant that the story which the authors choose to epitomize maker empowerment—the ultimate goal of maker-centered learning—is a story of repair. What is it about the act of repairing here, rather than, say, invention, creation, or building from scratch, that cuts straight to maker empowerment? Are making and repairing two separate things? Or are they two sides of the same coin, so to speak, intimately interconnected?

The Culture of Repair working group posits here two core arguments—first, simply, that repair is making, and secondly, that repair adds multiple rich dimensions to maker-centered learning. Using the Agency by Design framework as a lens, we will explore how repair is intimately intertwined and related to making. But it also goes further—as a dynamic act of agency with political, environmental, and ethical implications, we believe repair reorients our goals for maker-centered learning, informing everything from the materials we choose to the projects and activities we plan. While repairing, we both activate maker dispositions and inflect those positions with an ethical and political dimension, inviting reflection on how the personal impacts the local and the global and how we as persons interface with objects and systems.

REPAIR IS MAKING

Seen through the Agency by Design framework, repair and making inhabit the same space, therefore providing the same benefits as maker-centered learning. From the narrative above about Jimmy and maker empowerment, to the capacities that cultivate a sensitivity to design, to Agency by Design's unique and important focus on systems thinking—repair is a poster child for maker-centered learning.

The Agency by Design framework, which supports the development of maker empowerment, includes three core parts of dispositional theory: sensitivity, inclination, and capacity, as seen in the definition of maker empowerment:



Maker Empowerment: “A sensitivity to the designed dimension of objects and systems, along with the inclination and capacity to shape one’s world through building, tinkering, re/designing, or hacking” (Clapp et al. 98).

Because sensitivity turns out to be the most challenging and most unsupported part of a disposition, the framework focuses on developing sensitivity, in this case a sensitivity to design.

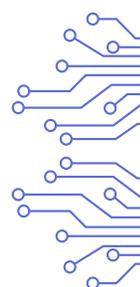


Sensitivity to design: “Being attuned to the designed dimension of objects and systems, with an understanding that the designed world is malleable” (Clapp et al. 117).

The researchers broke sensitivity down further into three capacities and this is where repair shows up most vividly—right in the heart of the framework. *Looking closely, exploring complexity, and finding opportunity* are the capacities that cultivate a sensitivity to design. In the story of Jimmy repairing his backpack there's evidence that he engages in all three of these core capacities. For example, Jimmy finds opportunity when he notices a local fabric shop and decides to go in, he looks closely at the materials and tools he will need to fix his backpack, and he explores the complexity of zippers and how to replace one when watching YouTube videos.

One of the tools used to scaffold for the capacities are thinking routines, and one of the most versatile is the Parts Purposes Complexities (PPC) thinking routine. During our research, the more we looked at objects for repair, the more we noticed a direct correlation with a core Agency by Design experience: the “take apart,” using the PPC routine.

What we discovered is that developing a sensitivity to design is an innate part of building a sensitivity to repair. While inviting adults and young people to look closely at objects in need of repair we noticed a natural attraction towards whether or not an object was working and how to fix it. Sometimes this question came up immediately “Does it work?” and other times an idea revealed itself many layers into the conversation, “Oh, look, there's a lever under here—maybe if you re-glue that it would move?”



Learn more about our efforts to test and adapt the PPC thinking routine on the Maker Ed Blog - <https://makered.org/blog/building-a-culture-of-repair-in-maker-education/>

Ultimately, what we concluded is that when you use PPC for developing a sensitivity to design, you are also developing a sensitivity to repair. That is, getting your hands on something and investigating it closely, understanding its parts, purposes, and complexities, provides you with an understanding of how it works, and therefore why and how it doesn't or might not work in the future. The tools section of our toolkit, starting on page 16, doesn't include an adaptation of the PPC thinking routine because we highly recommend using it as is, with objects that do or don't need repair.

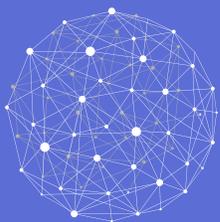
As discussed, repair has extensive connections with Project Zero's maker-centered learning framework, but the last one we'll discuss here is systems thinking, an area unique in the maker landscape.



This specifically shows up in the capacity of Exploring Complexity, defined as: "Building on close observations and explorations of complexity to see the potential for building, tinkering, re/designing, or hacking objects and systems" (The Framework for Maker-Centered Learning).

All objects are connected to systems. When taking apart an object there's often a moment of deep systemic understanding. For example, I remember taking apart a coffee maker and was surprised to discover copper inside (a great electric conductor). I remember envisioning the mines that extract copper from the earth, and then I had a sudden wondering around child labor and if kids were involved in the system of getting this material into my hands. I've also come to recognize the signs that an object has been designed for obsolescence. For example, plastic toys are often connected with adhesives, plastic welding, or interlocking parts (as opposed to screws), all of which makes putting them back together unlikely.

The Right to Repair movement is trying to change this—they fight for consumers' and independent repair shops' access to the information, tools, and parts needed to fix the objects we purchase. And, we agree, as our stance on page six puts forth. For example, many of us have tried to repair our own cracked smartphones. In my case, I was able to find an online instruction video and tiny tools, but I didn't get these from the manufacturer, many of whom privilege their economic incentive to not help us repair. Instead, imagine if when we purchased an item we were also purchasing the instructions and tools to fix it when it fails. What implications would that have and how might that impact our agency in the world around us?



"THE EMPOWERMENT EMBOLDENED BY REPAIR IS ABOUT REGISTERING ONESELF AS A MEMBER OF AN ECOLOGY OF THINGS, AND OTHERS, TO WHICH ONE IS RESPONSIBLE."

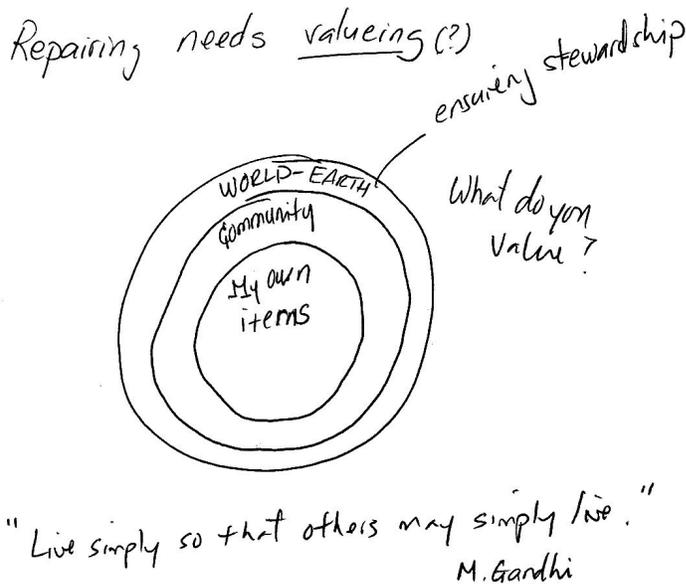
Working group member, Susan Wolf, attempts a repair of Pinnochio, a toy that's sat broken for 20 years on her dresser. Her insights: "Objects tell stories and meditating on Pinnochio's lying in our current context is depressing. Also, the process of repair was hard. Finding the right material took three trips to different stores." (Wolf)



REPAIR ADDS DIMENSION TO MAKING

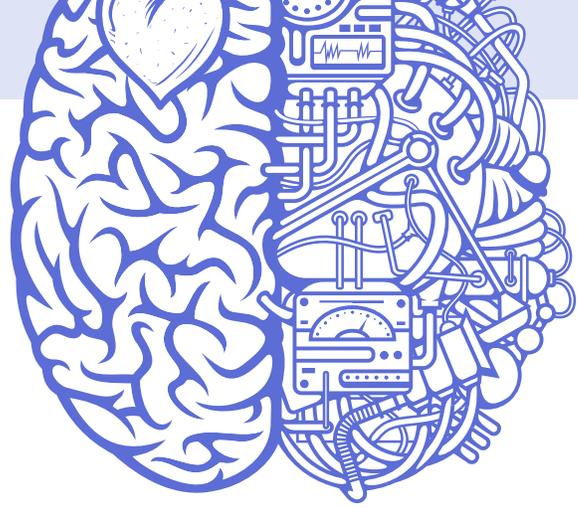
Repair adds multiple rich dimensions to both making and maker-centered learning. To start, it is personal. The act of repair arises out of a personal relationship between repairers and objects and ends in a renewed and enhanced chapter of that relationship.

As the story of Jimmy makes clear, the connection and relationality inherent in the process wouldn't be present if Jimmy were learning to sew zippers without the purpose and need for repairing his beloved bag. But the systemic implications of repair go beyond an individual's own relationship to the object. The empowerment emboldened by repair is about registering oneself as a member of an ecology of things, and others, to which one is responsible, whether that's seen through an environmental, ethical, political, or economic lens.



Ngà Nguyễn's reflection after one of our working sessions. He wonders if repair requires valuing, and explores how our own items relate to the communities we are a part of.

There's a reason people throw out "broken" objects and buy new ones—repair requires time and determination. As we can see with Jimmy, and as we've experienced in our own lives, you have to really want to repair something, either out of necessity, love, or ethos. If you're lucky you have the resources (a person, a work bench, tools, research capacity, a nearby hardware store to run to three times, and time), but most of us have to slog through the repair. While the process of repair invites multiple off ramps to new journeys towards what the Agency by Design project calls "making self," "making stuff," and "making community," all rich learning endeavors, they take time and aren't linear (Clapp et al. 19-42).



As previously stated, the choice to repair an object is inherently intertwined with other systems. When we decide to repair an object we are choosing to engage with the object on our own terms, casting off the desires of the manufacturer and working in opposition to our culture of consumerism. Therefore, it becomes a political act. When Cuban citizens repair and remake everyday objects, which you can learn about extensively through industrial designer Ernesto Orozco's curatorial project Technological Disobedience, they are wielding agency in their everyday lives, making do with what they have. But there is also no way to separate this act from the global context and larger political systems, which in this case are anti-American and socialist (Cuba's DIY Inventions).

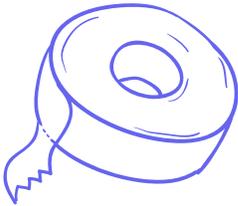
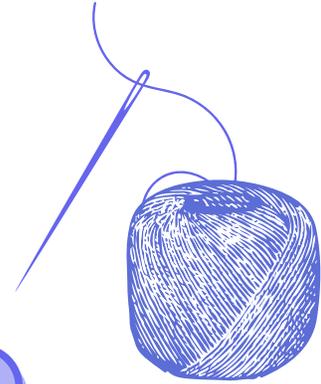
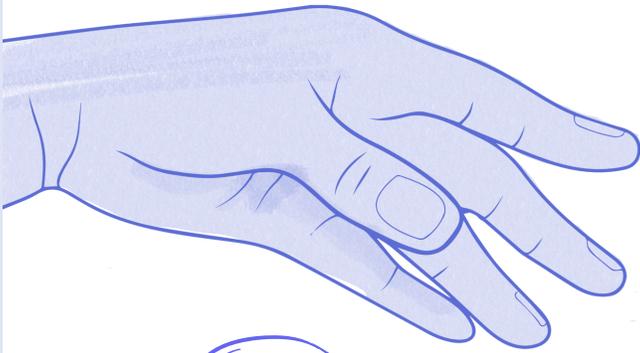
Working Group members Reina and Aaron attempt to repair Reina's paper shredder using the PPC routine. Reina hopes it can be fixed rather than buying a new one.



Lastly, repair offers a concrete act of environmentalism. With the rise of the Sunrise Movement and the precipitous brink of climate change, repair is both an act of disruption vis-à-vis endless cycles of waste and a powerful figure in orienting our relationships to the taxed and ailing ecosystems that sit at the intersection of the earth and climate (The Sunrise Movement).

TO REPAIR IS A DYNAMIC ACT OF AGENCY WITH POLITICAL, ENVIRONMENTAL, AND ETHICAL IMPLICATIONS.

Clearly, repair invites a reflection on how the personal impacts local and global systems. To repair is a dynamic act of agency with political, environmental, and ethical implications. When viewed as an extension of making, repair reorients our goals for maker-centered learning, informing everything from the materials we choose to center, to the projects and activities we plan. And even more importantly, repair is an invitation to experience new ways of being and knowing and new perspectives on how we relate to and interact with our surroundings.

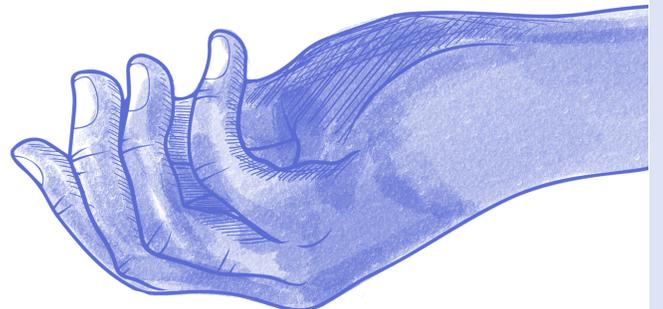
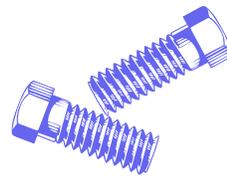
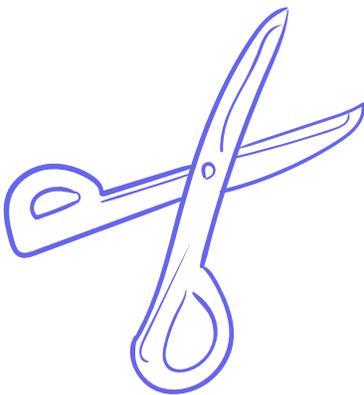


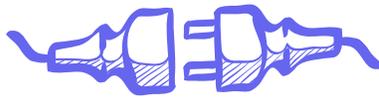
TOOLS

FOR CULTIVATING A

REPAIR

MINDSET

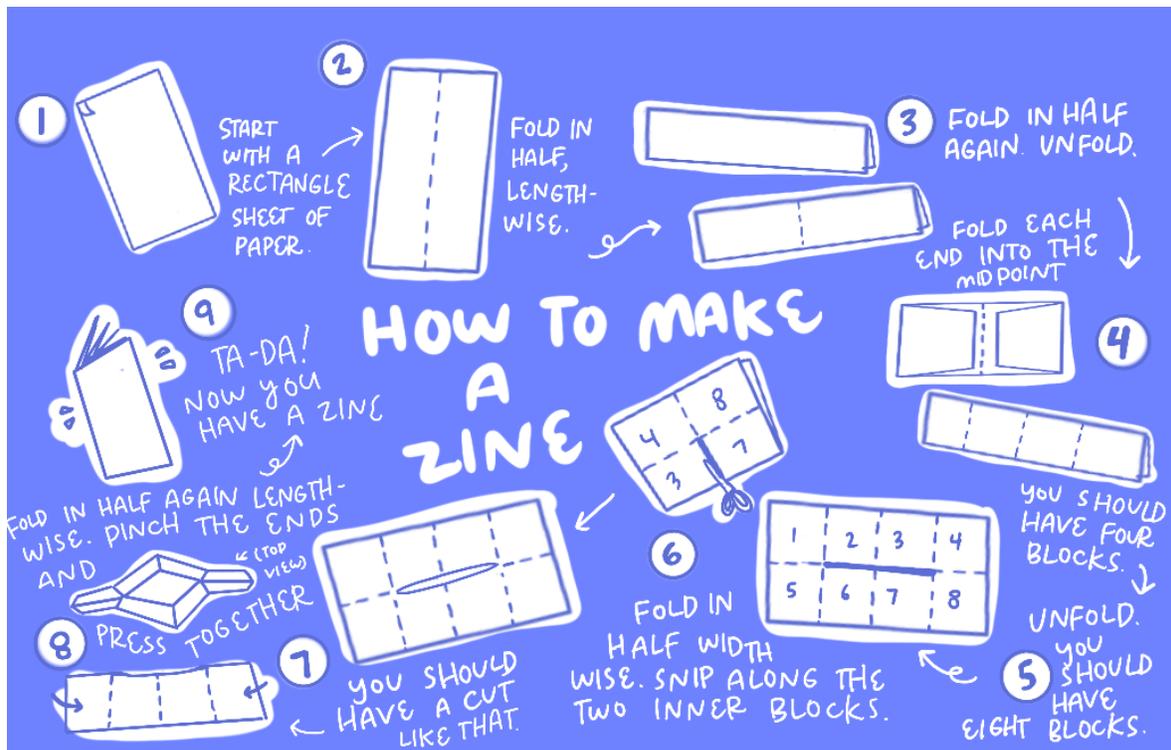




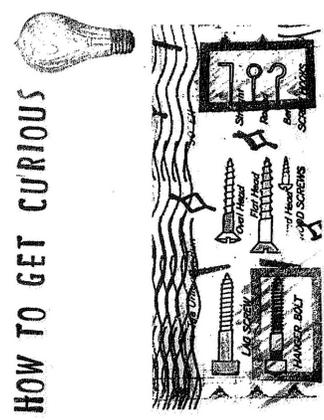
HOW TO GET CURIOUS

ABOUT REPAIR

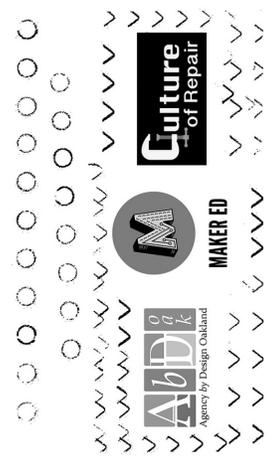
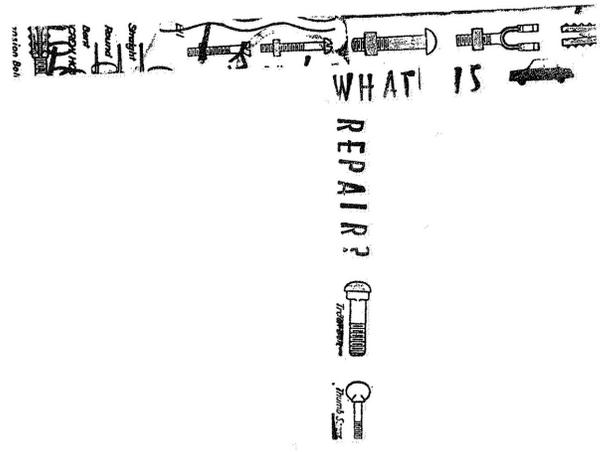
Print and engage with our poncho style zine on the next page, created by Susan Wolf. Below are directions on how to fold a poncho zine, illustrated by Bri James.



ABOUT REPAIR



HOW TO GET CURIOUS



This zine is part of a collaborative research project between Agency by Design Oakland, The Culture of Repair Project, and Maker Ed. We are a small group of educators thinking about how to cultivate a mindset of repair. Much of our work builds on the Agency by Design framework and tools from Project Zero, HGSE.

This zine was designed by Artist & Educator, Susan Wolf.

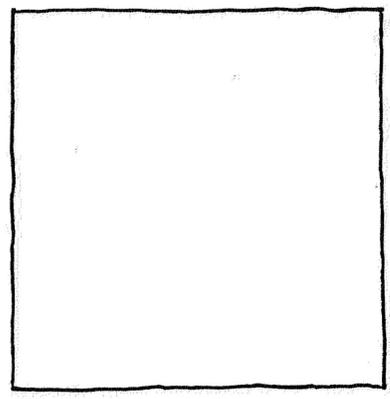
DRAW & TELL ☆☆☆ THE STORY

TRY TO REPAIR 1 THING

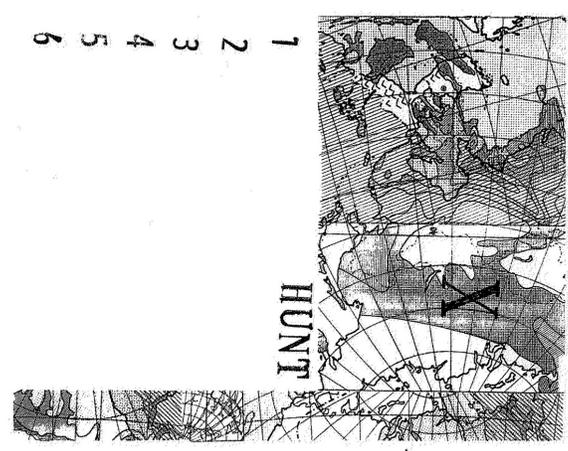


WHAT IS IN YOUR TOOLBOX?

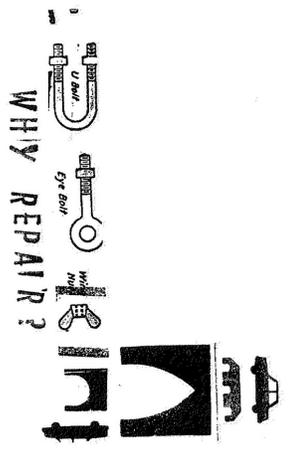
SKETCH ONE



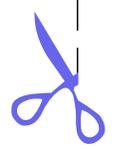
WHAT NEEDS FIXING
WHY?



- 1
- 2
- 3
- 4
- 5
- 6



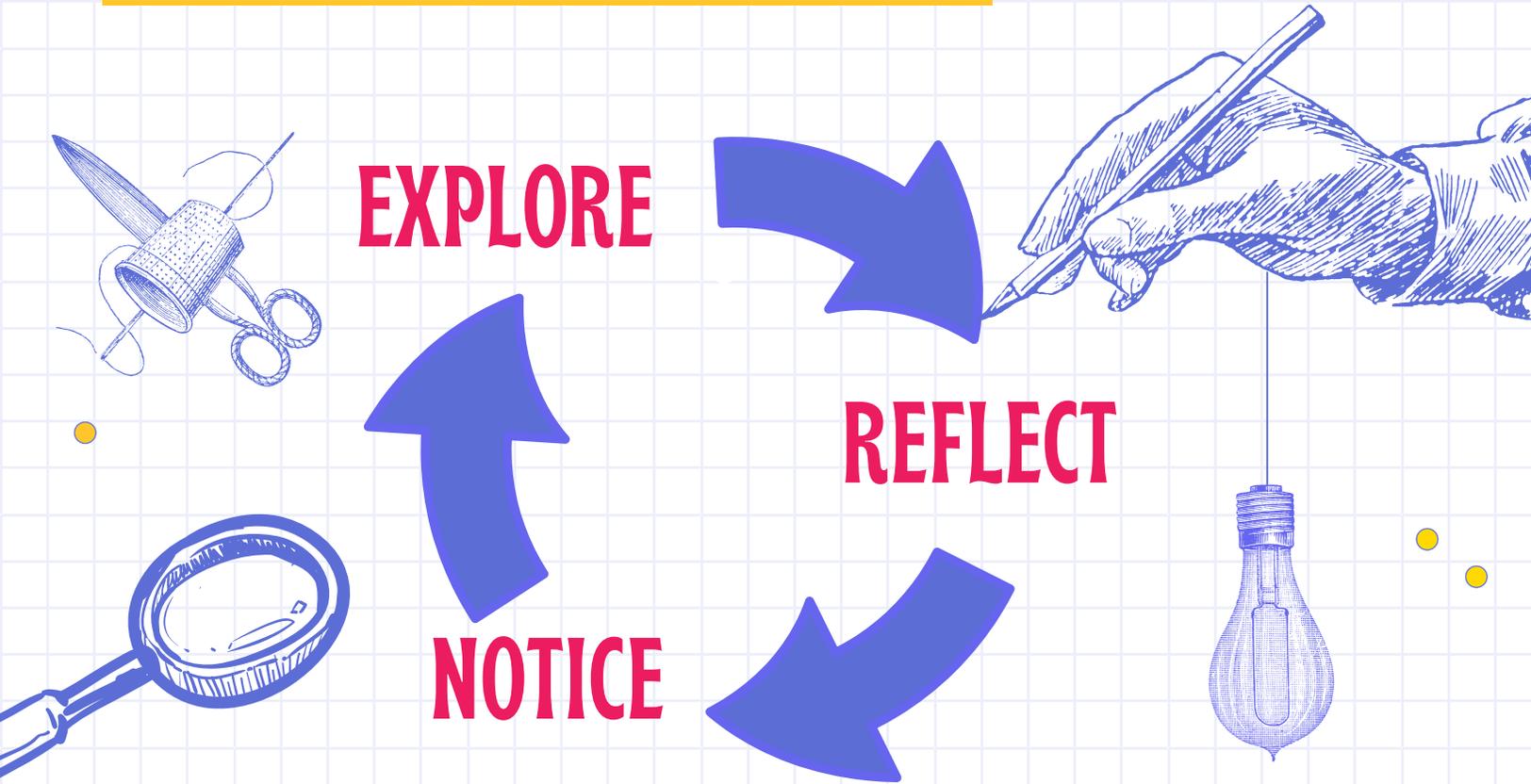
This zine works best on 11"x17" paper. Download at <https://bit.ly/RepairZine> To use on 8.5x11 cut along the dotted line.



Share your experience with this tool on social media using the hashtags #RepairMindset and #MakerEd

For more resources visit: <https://resources.makered.org/>

REPAIR EXPLORATION



Explore

What materials is the object made from?

- Wood
- Fabric
- Metal
- Wire
- Paper
- Plastic
- _____
- _____

How might you explore?

- Pick up
- Rotate
- Press buttons
- Pull
- Push
- Plug it in
- Shake
- Listen
- Open it
- _____

Notice

- What's inside the inside?
- How might you open it?
- What parts change directions?
- What types of motion do the parts allow?
- What are the relationships between the parts?
- _____

Reflect

- After exploring the object, what are some questions you have now?
- What, if anything, do you think needs repair? How do you know?
- What might you choose to do next?
- Is it something that can be fixed?
- Do you want to fix it?
- Challenge: What are some new ideas you have about the object?

REPAIR EXPLORATION

SUGGESTIONS for IMPLEMENTATION

While these suggestions come from our experience, you are the expert in your classroom and can understand more deeply your needs for implementation.

Framing

The Repair Exploration tool is designed to cultivate a sensitivity to and curiosity about how objects and systems work by looking closely at them. By providing structured exploration time, we hope learners develop an inclination to repair, rather than replace.

3-11 Years Old

Touching is learning! Consider short learning segments for learners to look, explore, touch, notice, and reflect.

Teacher framing and modeling is important with our youngest learners. Model with a think aloud and have an adult scribe or record for learners who are non-writers.

12+ Years Old and Adult Learners

Small group work fosters purposeful collaboration and communication. Two to three students per object allows for all to be meaningfully engaged.

Group roles create structure and cultivate learners' agency. Some roles to consider: a team captain that facilitates decision-making, a materials manager that ensures all tools are organized and maintained, and a recorder who captures the process from beginning to end.

Materials

Students can go on a “repair hunt” to identify items in the classroom, the school, or at home and teachers can collect objects to explore. For example: clothing that needs mending, mechanical objects (pencil sharpeners, kitchen tools), toys, electronics, etc. Building a repair mindset and developing a sensitivity to design can also occur with fully working objects.

Optional but useful: A variety of handheld tools to open up objects and/or start to repair, such as screwdrivers of various sizes, pliers, wrenches, hammers and safety goggles, power supplies & multimeters for use with electronics.

Extensions

Repair exploration is a great jumping off point for any number of other activities, such as invention, exploring the engineering process, creating sculpture, and researching the lifespan of machines. Students can scavenge for objects and can also take objects apart for screws, nails, DC motors, switches, computer fans, battery packs, and more. This emphasizes the value of repair and repurposing as opposed to replacing or buying new.

Personalize a repair exploration by looking closely at an object that has special meaning to learners. Consider using the Repair Journal tool to record and reflect the experience.

This tool was developed and tested by Paula Mitchell and Reina Cabezas. It was inspired by the [Materials Exploration](#) practice from the [AgencybyDesign.org](#) research project at Project Zero, Harvard Graduate School of Education.

PARTS, PERSPECTIVES, AND ME

Choose an object that appears to be broken and ask:

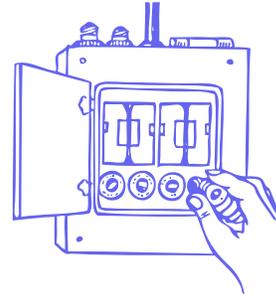
What are its parts?

What are its various pieces and components?

What parts are broken or in need of repair?

You might:

- Illustrate and label the object
- Focus on the broken part(s)
- Take apart the object



What perspectives can you look at it from?

How would different users, community members, repairer(s), see it?

You might:

- Reflect on the value & purpose of the object
- List who has interacted with it

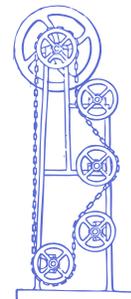


How are you involved?

How are you involved with the object and with the repair?

You might:

- Share the story of this object
- Reflect on the purpose of the repair (aesthetic, functional, for safety, etc)
- Think about how you will participate in its repair



This tool is an adaptation of the Parts, Perspectives, and Me thinking routine from the Agency by Design research project at Project Zero, Harvard Graduate School of Education.

Parts, Perspectives, and Me

SUGGESTIONS for IMPLEMENTATION

PURPOSE

What kind of thinking does this thinking routine encourage?

This routine supports learners to slow down and look closely at an object while considering the life of the object in relation to themselves and others. In doing so, the routine supports the development of key indicators, abilities, and sensitivities that comprise a repair mindset, including the tendency to value objects and see what others value, the awareness of the possibility of repair (whether for original use, for a new use, or for entirely novel purposes), the ability to look closely to identify the area of repair, and noticing the connection to cultures of repair (elders, other times, places, people) as well as to the past, present, and future lives of the object.

APPLICATIONS

Where and when can I use this routine?

This routine is primed for any time learners look at objects that need repair and can be used individually or in groups to approach an object before rehabilitating it. The routine can also support learners to share about meaningful objects in their lives and their relationships to them.

TIPS FOR FACILITATION & EXTENSION

- This thinking routine is enhanced when users are able to document their exploration in parallel, illustrating and labeling their objects. Chart paper, scrap paper, pens, markers, and pencils are all great at-hand materials that enable this.
- Facilitating this thinking routine in groups can also enrich the “Perspectives” and “Me” prompts.
 - After learners reflect on how different users and community members may use and relate to the object, they can interview each other to find out how an object they’ve chosen relates to and/or impacts their interlocutor.
 - Learners can also work through a version of the routine that is “Parts, Perspectives, and We,” asking others how they envision themselves involved in the repair of the object.

This tool is an adaptation of the [Parts, Perspectives, and Me](#) thinking routine from the Agency by Design research project at Project Zero, Harvard Graduate School of Education.



SUGGESTIONS for IMPLEMENTATION

The purpose of this activity is to:

- Develop awareness of the objects around us that are important to us and that need our care.
- Storytelling - connect personally to our belongings.
- Envision and document our process for repair.

Teacher Extensions:

The repair journal is a starting exercise that could be deepened and extended for a multitude of grade levels and contents. In addition to your content objectives we invite you to pay attention to where students are going and follow their lead. What emergent questions and ideas are coming forth? Where and how might you build bridges between curricular areas?

For example:

- To emphasize writing skills with lower elementary, invite students to write and illustrate three parts—a beginning, middle, and end.
- For middle schoolers design a discussion around assumptions and language.
 - What assumptions do we make when we go to someone's space and decide something is "broken"? Can something be "broken" to one person but not for another? What assumptions do we also make about people?
- In a math class this is an opportunity to track and graph everyday objects in our environments that need repair. How many people notice similar things? What category of repair do they fall under? Fiber? Technology? Other?



How did you figure it out?

Sketch and describe the important steps.



I REPAIRED THIS

NAME _____ fixed _____!

Ask me if you need help.

This journal was designed by Artist & Educator, Susan Wolf. Share your experiences with this tool on social media using the hashtags #RepairMindset and #MakerEd.



For more resources visit:
<https://resources.makered.org/>

Fold Here

REPAIR JOURNAL

Find an object that needs repair, and that you *want* to repair.
Draw and tell the story of the object.

Who uses it and why do you want to repair it?
Is it "broken"? Do you know what happened to it?



FINDING

PLAN: How will you fix it? What materials & tools will you use?



FIXING

PAUSE & REFLECT

While you're repairing, consider:

What is your strategy?

What tools you are using?

What challenges you are facing?

COLLABORATE: Ask friends for tips & tricks



CONNECTING

Notes

Date / /

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.

RESOURCES

Desobediencia Tecnológica: de la revolución al revolico

<http://www.ernestooroza.com/desobediencia-tecnologica-de-la-revolucion-al-revolico/>

Developing a Repair Mindset with Middle School Students

<http://www.abdoakland.org/news/2019/3/17/developing-a-repair-mindset-with-middle-school-students>

How the Japanese Art of Kintsugi can help you deal with stressful situations

<https://www.nbcnews.com/better/health/how-japanese-art-technique-kintsugi-can-help-you-be-more-ncna866471>

“It’s Your iPhone. Why Can’t You Fix It Yourself?”

<https://www.nytimes.com/2019/04/06/opinion/sunday/right-to-repair-elizabeth-warren-antitrust.html>

Truth and Historical Amendment: Critical Mending in the Classroom

<http://www.agencybydesign.org/node/469>

My Indigenous Culture is an Act of Resistance

<https://www.yesmagazine.org/environment/2019/09/27/canada-native-indigenous-culture-resistance>

Culture of Repair - Educator Resources

<https://www.cultureofrepair.org/educator-resources>

Culture of Repair - Practical and Technical Resources

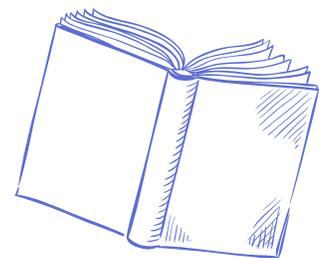
<https://www.cultureofrepair.org/repair-resources>

Repair: The Impulse To Restore In A Fragile World

a 2002 book by Elizabeth V. Spelman (Beacon Press)

Restart @school session 9: Exploring the value of gadgets for reuse and recycling (sample lesson plan)

<https://therestartproject.org/education/restart-school-session-9-exploring-the-value-of-gadgets-for-reuse-and-recycling/>



RESOURCES (CONT.)

RJOY (Restorative Justice for Oakland Youth)

<https://rjoyoakland.org/what-is-rj/>

Slow Looking: The Art and Practice of Learning through Observation

a 2018 book by Shari Tishman (Routledge)

REFERENCES

Clapp, Edward P., et al. *Maker-Centered Learning: Empowering Young People to Shape Their World*. Jossey-Bass, 2016.

Jackson, Steven J. "Rethinking Repair." *Media Technologies: Essays on Communication, Materiality and Society*, edited by Gillespie et al. MIT Press, 2014, pp. 221-239.

Perkins, D. N. et al. "Beyond Abilities: A Dispositional Theory of Thinking." *Merrill-Palmer Quarterly*, 39, 1, 1993, 1-21.

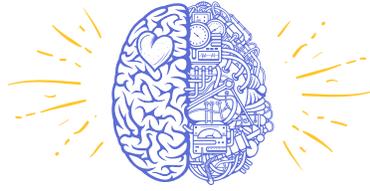
Wolf, Susan. "Why Is Repair Depressing?" Susan Wolf, <https://susanwolf-projects.squarespace.com/journal/repair>

"Cuba's DIY Inventions from 30 Years of Isolation." YouTube, uploaded by Motherboard, 20 June 2014, <https://www.youtube.com/watch?v=v-XS4aueDUg&t=129s>

"The Framework for Maker-Centered Learning." Agency by Design, <http://www.agencybydesign.org/explore-the-framework>

"The Sunrise Movement." <https://www.sunrisemovement.org/>





APPRECIATIONS

A SPECIAL THANK YOU TO THE FOLLOWING

Vita Wells

Shari Tishman

Edward Clapp

Peter Mui

The Maker Ed team, especially Bri James and Justin Boner

Repair Cafes at the Berkeley City Library

Wood Middle School

Maker Ed's Community Studio

This toolkit was made possible by The Culture of Repair Project

This toolkit is part of a collaborative research project between Agency *by* Design Oakland, the Culture of Repair Project, and Maker Ed. We are a small group of educators thinking about how to cultivate a mindset of Repair. Much of our work builds on the Agency *by* Design framework and tools from Project Zero at the Harvard Graduate School of Education.

The Culture of Repair Project's vision is that Repair be an actionable and pervasive cultural value. They support initiatives working to develop a world that reflexively, competently and confidently turns to repairing before discarding our stuff. Support takes the form of collaborating with other organizations, providing logistical support, sharing information, and securing resources.

Agency *by* Design Oakland believes all learners have the potential to be empowered change makers in our democracy. They use maker-centered learning to support equity, critical thinking, joyful school culture, and a shift to learner-driven practice. They grew out of a collaboration with the Agency *by* Design research project based at Project Zero, a research center at the Harvard Graduate School of Education. They lead professional development for educators, with a focus on equity and sustainable change.

Maker Ed believes that maker education is a tool to create more equitable, just, and liberatory learning experiences for youth. Through targeted work with educators from historically underrepresented communities, teaching under-resourced populations, and/or those interested in liberatory pedagogical shifts, we disrupt inequitable educational practices, increase access to maker-centered resources, and increase student agency, criticality, joy, and intellect-building in all learning spaces.

WHO WE ARE

REPAIR WORKING GROUP

“Repair is noticing something broken, and holding a value connected to that brokenness that initiates next steps.”

- Susan

“Repair is to have concern, care, & curiosity.”

- Brooke

“Repair might not be what it was at the beginning, but it will be something that you are comfortable with.”

- Ngà

“Repair (re)creates wholeness and is the way forward to creating a more sustainable future for our planet.”

- Paula

“Repair is to heal, make whole, so the person gets to determine what gets to be made whole, for them, and there are three different levels that I can see myself entering this conversation - personal level, interpersonal and the global level.”

- Reina

“[Repair is] returning to wholeness, to usefulness, to beauty, to function.”

- Aaron



Ngà Nguyễn

Teacher
(Technology Art & Design, Math, Japanese) Wood Middle School, Alameda Unified School District, CA

Brooke Toczyłowski

Co-Director, Agency by Design Oakland

Susan Wolf

Artist & Arts Integration Specialist, Coach, Agency by Design Oakland

Paula Mitchell

Co-Director, Agency by Design Oakland & Teacher on Special Assignment, Grass Valley Elementary, Oakland Unified School District, CA

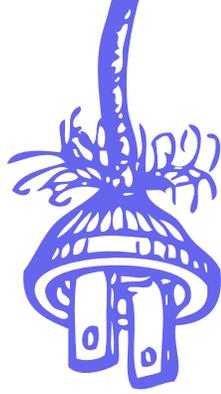
Reina Cabezas

Science Teacher, Sustainable Urban Design Academy, Castlemont High School, Oakland Unified School District, CA

Aaron Vanderwerff

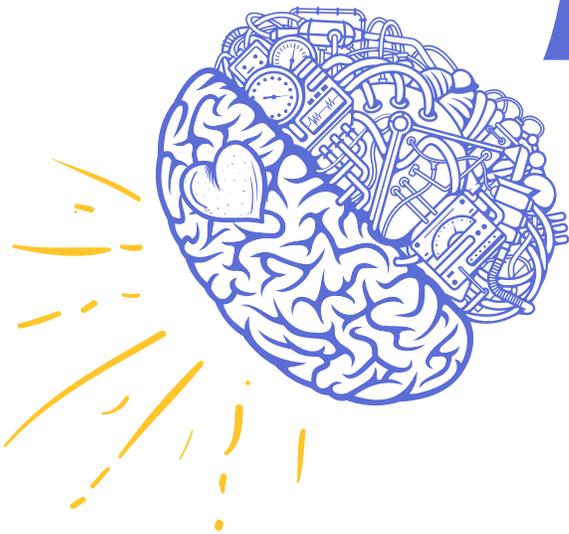
Director of Learning, Maker Ed

In addition, Vita Wells, founder of The Culture of Repair Project, was a key player and participant in our working group.



"REPAIR IS A REVOLUTIONARY ACT"

- ROSE MARCARIO
PATAGONIA CEO



This work is licensed under CC BY-NC 4.0.
To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/4.0/>

We hope you enjoyed this exploration into repair.
For more resources visit: <https://resources.makered.org>