Mindful Pieces

Promoting self-regulation in students with learning differences

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EMILY CARR UNIVERSITY OF ART AND DESIGN

MASTER OF DESIGN THESIS 2019

Mindful Pieces: Promoting self-regulation in students with learning differences

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BA, New York University Abu Dhabi, 2016

A CRITICAL AND PROCESS DOCUMENTATION PAPER SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF DESIGN

EMILY CARR UNIVERSITY OF ART + DESIGN

2019

I would like to extend my gratitude to the many people who gave their time and expertise to this thesis project.

To begin with, I thank the administration at Kenneth Gordon Maplewood School for being so open and enthusiastic about exploring new ways to practice mindfulness with their students. Special thanks to Dr. Jim Christopher, Marie Watler, Neil Pinkerton, Amber Hitchen, Jennifer Alexander, Stella Tsiknis, Jennifer Wallis, Ilona Otten, Kinza Pirzada, Tanisha Santino, Colleen McCoach, Katy Southerland, Cara Koehler, Megan Istvanffy, Brett Garef, Erika Vieweg, and Rachel Roubini for finding time to speak with me, allowing me to observe classes, and setting aside class time for me to interact with their students. Without your contributions, this project would not have been possible. I also thank the students for being so curious and excited about mindfulness.

I thank my supervisor Cameron Neat, for making time within his busy schedule to read my work and offer his advice.

To Caylee Raber, whose thesis project led me to pursue my own thesis at Emily Carr: thank you for being my role model.

Thank you to the design faculty at Emily Carr University for the countless critiques, challenges, and encouragements, especially from Laura Kozak, Louise St. Pierre, Chris Hetherington, Garnet Hertz, Katherine Gillieson, Keith Doyle, Deb Shackleton, Craig Badke, Gillian Russell, and Hélène Day Fraser.

To mindfulness instructors Shahin Najak and Brett Peterson: your knowledge and expertise inspired this project.

Finally, I thank the MDes 2019 cohort for all the peer reviews, presentations, potlucks, and conversations in the studios. Special thanks to Sherry Kuo, Alejandro Alarcon, and Michal Cabaj. I could not have done this without you by my side.

One of the most important concepts within mindfulness is the dichotomy between *thinking* and *feeling*.

In the frantic hustle and bustle of everyday life where we have to remember what happened yesterday and prepare for what is coming tomorrow, we often forget to ask ourselves, "How am I feeling?"

In his online video course for Mindful Schools, an organization that trains educators to implement mindfulness into K-12 curriculums, course trainer Chris McKenna criticizes how modern society values thinking over feeling. "We're thinking all the time and we don't stop thinking," McKenna observes. "and the bandwidth in our reality given to other aspects of our experience—our emotional experience, our sensory experience, and then this quality of awareness itself—gets almost no airtime" (Mindful Schools, 2017b, 1:47-2:08).

In a society where we are locked inside our minds, mindfulness offers a way out by emphasizing "felt sense", or what we can see, hear, touch, taste, and smell. It recovers an awareness of what is happening inside us and around us, so that we may be truly present with our experiences. To give an example, McKenna calls upon students to remember an instance of a good memory shared with family or friends.

"That sense of being really really there and really really joyous and really really receptive—if you look at those moments and your experience—what they have in common is that just in that moment you could feel. That's why it felt so good," he says (Mindful Schools, 2017b, 5:51-6:09). By activating our feeling minds, mindfulness allows us to absorb the richness of the present moment without the distraction of thought.

Throughout this document, I have inserted moments of mindfulness where readers are invited to take a break from their thinking minds, and engage with their feeling minds through exercises such as breathing and body scanning. I hope that through these mindful moments, readers can experience first-handedly the power of feeling, and apply these mindfulness techniques in their daily lives.

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In the field of developmental psychology, mindfulness, or the state of present awareness, has shown promising results in enhancing self-regulation abilities in children in classroom settings.

Such findings may suggest particular benefits to children with learning differences, who commonly struggle with the ability to control thoughts, emotions, and behaviours due to neurologically-based challenges. Unfortunately, many mindfulness interventions, which include activities such as yoga and martial arts, require specialized training on behalf of the instructors. Furthermore, formal mindfulness practices (such as meditation) do not suit the limited attentional capacities of young children.

A similar intervention that requires introspection, art therapy has presented art-making as a familiar, non-verbal, engaging, and enjoyable action that "demands presence in body, mind, feelings and, many would say, soul" (Learmonth & Huckvale, 2008, p.11). Borrowing concepts from art therapy, this thesis project explores art-making as a way for children with learning differences to practice mindfulness in classroom settings. Specifically, this project introduces a tool that implements mindful art-making as a transitional activity in grades 1-3 classrooms. The research takes place at Kenneth Gordon Maplewood School (KGMS), an alternative elementary school in North Vancouver for students with learning differences. Through iterative processes of prototyping, user testing, and feedback, this research devises a mindfulness tool that accommodates both for the gifts and challenges of children with learning differences, and the skillsets of their teachers.

The development of a tool that offers art-making as a mindfulness practice allows mindfulness to be implemented as a transitional activity that promotes self-regulation in the KGMS grades 1-3 classrooms.

1. Implement mindfulness as a transitional activity in the KGMS grades 1-3 classrooms in a way that adheres to the school's unique educational values and culture.
2. Equip teachers, who are not certified mindfulness instructors, with the resources to teach art-making as a mindfulness practice to their students.
3. Identify what mindfulness means in the context of KGMS and children with learning differences.

In 2016, I worked in Tokyo as an instructor at an after school care center for students with learning differences.

Working mainly with children from grades 1 to 3, I observed a range of disruptive and harmful ways in which they reacted to emotionally overwhelming events. Situations such as fighting for toys or frustration with homework would lead to displays of aggression, self-injury, and physical harm to others. From this experience, I wondered if I could help these students manage their feelings more constructively, through design.

Decades of research in the fields of developmental health and psychology have recognized the benefits of mindfulness in promoting children's self-regulation skills (Beauchemin, Hutchins, & Patterson, 2008; Schonert-Reichl & Lawlor, 2010; Schonert-Reichl et al., 2015). These findings suggest positive implications for children with learning differences who often face greater struggles in self-regulation, or controlling their thoughts, emotions, and behaviours, compared to their counterparts without such diagnoses (Qureshi, 1994, p.25-6).

Self-regulation is listed in British Columbia's school curriculum as a skill within the competency of Personal Awareness and Responsibility, one of the 6 Core Competencies that BC schools seek to equip students with through grades K-12 (British Columbia Ministry of Education, n.d., p.3). The Ministry of Education describes the following characteristics under the competency profiles for "self-regulation": "I can sometimes recognize emotions. I can use strategies that help me manage my feelings and emotions." (p.3). Based on the challenges of students with learning differences and the goals of the BC Curriculum, there is a strong case for practicing mindfulness with children who have learning differences.

Mindfulness, by inviting us to focus on present experiences, provides opportunities for students with learning differences to identify, understand, and manage emotions productively instead of coping through meltdowns, aggressions, and self-injury (NICE, 2008, p.6). Many mindfulness interventions, however, require extensive training on behalf of the instructors. For instance, in a study that incorporated mindfulness yoga as part of a preschool curriculum, the teacher in the

experimental condition completed a 200-hour certification program prior to the intervention (Razza et al., 2008, p.375). Furthermore, such mindfulness interventions are not suitable for the attentional capacities of younger children who may not be able to sit and focus for extended periods of time (Coholic, 2011, p.314).

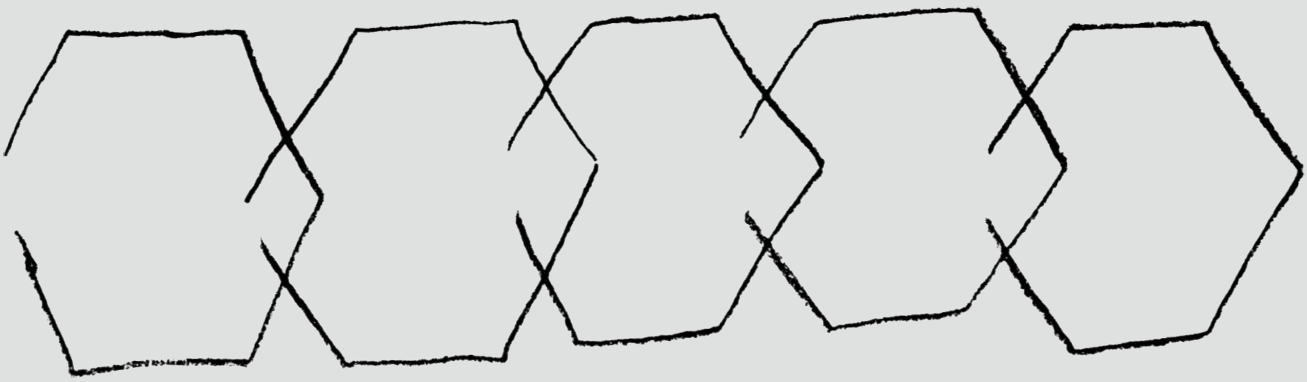
To make mindfulness accessible, engaging, and meaningful for students with learning differences and their teachers, this project offers art-making as a mode of mindfulness practice. Literature on art therapy reveals similarities between mindfulness and the process of creating art (Freilich & Shechtman, 2010; Dancevic, 2005; Bell & Robbins, 2007; Drake & Winner, 2013). Therapists describe art-making as a whole-body experience that awakens self-awareness and allows for creative explorations of present situations, which parallels the objectives of mindfulness (Learmonth & Huckvale, 2008, p.11). Additionally, the non-textual, participatory, and familiar nature of art may open doors for students with learning differences to become involved in mindfulness practices (Liebmann, 2004, p.8). With this secondary research in mind, the objective of this thesis was to investigate how art-making as a mode of mindfulness could benefit students and teachers at KGMS.

Fig. 1: Felt puzzles by grade 2 students. Photo: Mariko Kuroda

Before you read on,
I want to invite you
to take a mindful
moment. Let's take
some time right now
to just breathe.

To live, we need to breathe. Our bodies are designed to move air in and out. We don't have to think about it. But just right now, let's give our attention to our breath.

Trace the hexagon with your finger. Inhale, and trace the hexagon once. Exhale, and trace the hexagon again. Repeat it five times.



How does that feel? Maybe a few thoughts crawled into your mind while you were breathing. That's okay. Thoughts are just visitors. You can greet them, and let them go.

This section will define the following three terms that are integral to my thesis project:

1. Learning differences
2. Self-regulation
3. Mindfulness

1. Learning differences, or learning disabilities, cover a range of disorders that interfere with a way a person acquires, organizes, comprehends, retains, and applies non-verbal or verbal information

(British Columbia Ministry of Education, 2008, p.47).

They arise from neurological differences in visual-spatial processing, processing speed, phonological processing, and executive functions such as planning and decision-making. Learning differences may affect one or more of the following skills (p.47):

- Oral language
- Reading
- Writing
- Mathematics

Apart from these challenges, people with learning differences display average or above average capacities in thinking and reasoning. Thus, learning differences are different from intellectual disabilities (Learning Disabilities Association of Canada (n.d.)).

Common types of learning differences are the following:

- Dyslexia : Students with dyslexia have difficulties in reading, as well as in written and spoken language. Common challenges include word decoding, fluency, writing, and spelling (Cortiella & Horowitz, 2014, p.3).

- Dysgraphia: Students with dysgraphia have difficulties specifically in writing. Common challenges include forming letter shapes, writing within the lines, using correct syntax and grammar, and organizing thoughts on paper (Cortiella & Horowitz, 2014, p.4).

- Dyscalculia: Students with dyscalculia have difficulties in math. Common challenges include counting, calculations, telling time, and numerical estimation (Cortiella & Horowitz, 2014, p.3).

Conditions such as attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) are not types of learning differences. The former is a mental disorder, and the latter is a developmental disorder. However, students diagnosed with either conditions may also have learning differences. Studies estimate the comorbidity rate of learning differences and ASD to be 25.8-40% (O'Brien & Pearson, 2004, p.127), and 25-50% for ADHD (Hooper & Williams, 2005, p.218).

While the terms "learning disabilities" and "learning differences" are interchangeable in the realm of education, many favour the word "difference" over "disability". The choice comes from the concern that the word "disability" places a greater focus on cognitive deficiencies (Learning Disabilities Association of New York State, n.d.). In an effort to emphasize that students with learning disabilities are capable learners who require different forms of support and assistance, this thesis will also use the term "learning differences".

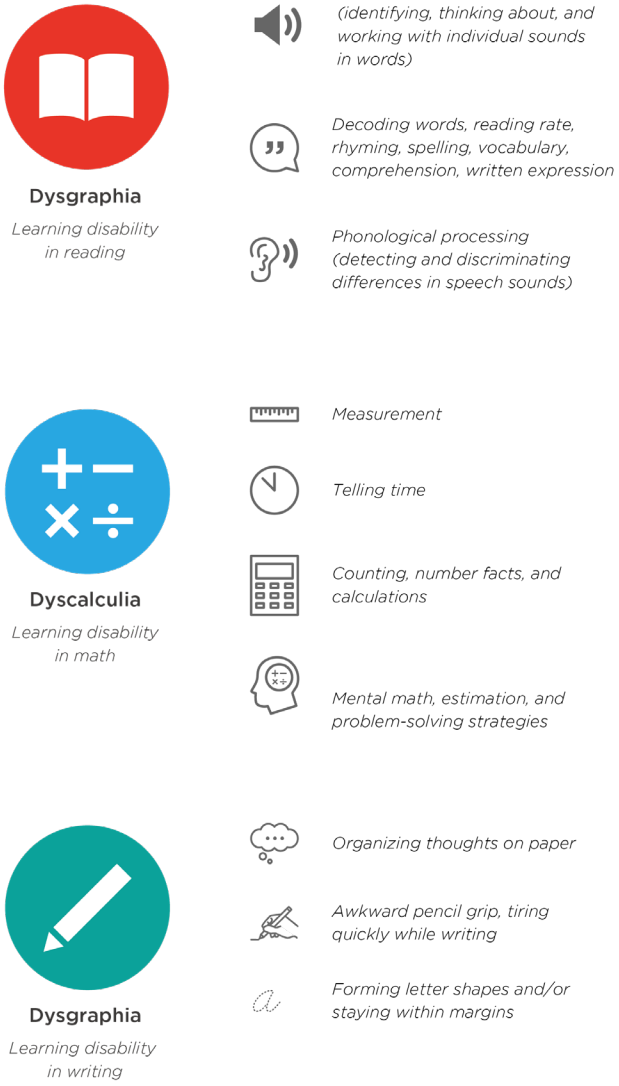


Fig. 2: Diagram of types of learning differences (based on Cortiella & Horowitz, 2014). Image: Mariko Kuroda

2. Students with learning differences commonly struggle with self-regulation, or the ability to control one's own thoughts, behaviours, emotions, and actions (McClelland & Cameron, 2011, p.136).

Addressed in the BC curriculum as part of a core competency for students of all abilities, high self-regulation skill correlates with many aspects of children's development such as higher academic performance, better mental health, positive interpersonal relationships, stronger coping skills, and lower levels of aggression (Galliot et al., 2007, p.325). Due to difficulties in processing information, students with learning differences are more easily overwhelmed by stressful situations, leading to challenging behaviours like aggression, violence, and self-injury (Qureshi, 1994, p.25-6).

Self-regulation relies mainly on three cognitive skills: cognitive or attentional flexibility, working memory, and inhibitory control (McClelland & Cameron, 2011, p. 137). Cognitive or attentional flexibility is the ability to sustain focus on tasks while ignoring distractions, and to shift focus to new tasks when needed. Working memory is the capacity to remember information while processing it, such as keeping the instructions of a game in mind while playing it. Inhibitory control refers to resisting impulsive responses, such as waiting for the school bell to be dismissed for recess (p.137).

Weaknesses in these three areas of executive functioning account for the challenges that students with learning differences face in self-regulating. Limitations in cognitive or attentional flexibility and working memory lead to difficulties in sorting, organizing, and prioritizing information that is necessary for effective decision-making and problem-solving (Meltzer & Krishnan, 2007, p.81). Combined with reduced inhibitory control, these factors may explain why students with learning differences often respond to emotional events through disruptive behaviours (NICE, 2008, p.6).

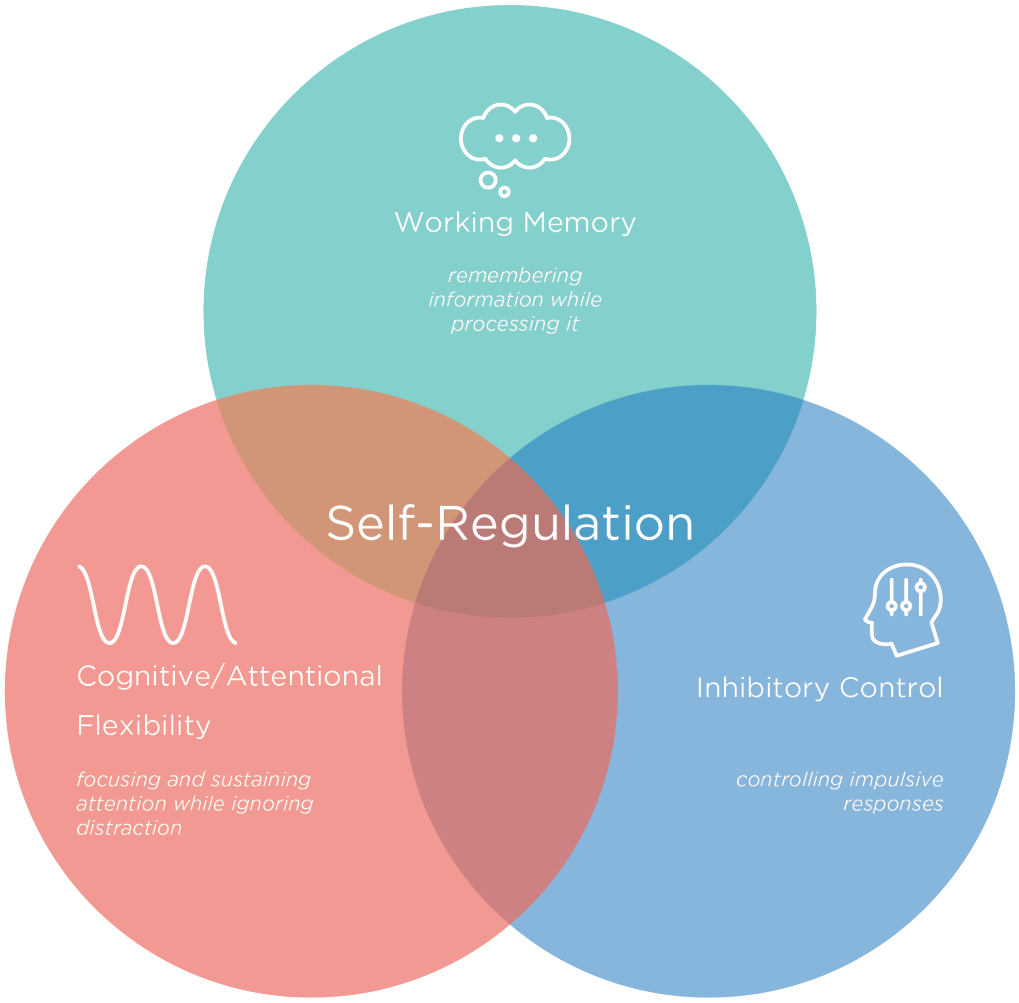


Fig. 3: Diagram of the components of self-regulation (based on McClelland & Cameron, 2011). Image: Mariko Kuroda

3. As educators seek ways to foster self-regulation skills in children, researchers have found potential in the practice of mindfulness (Beauchemin, Hutchins, & Patterson, 2008; Schonert-Reichl & Lawlor, 2010; Schonert-Reichl et al., 2015).

In the last four decades, mindfulness has evolved from a Buddhist concept into a term in popular culture that means a varying blend of equanimity, non-judgement, acceptance, self-awareness, focus, concentration, and more (Haslam & Van Dam, 2017). Despite its application in fields extending from psychotherapy to neuroscience, education, and even criminal justice, there is still no precise definition of mindfulness (Haslam & Van Dam, 2017). Nick Haslam and Nicholas T. Van Dam from the University of Melbourne illustrate its ambiguity: "A brief exercise in self-reflection prompted by a smart-phone app on your daily commute may be considered the same as a months-long meditation retreat. Mindfulness can both refer to what Buddhist monks do and what your yoga instructor does for five minutes at the start and end of a class." (Haslam & Van Dan, 2017). Through my thesis work, I will seek to define mindfulness as it relates to the context of KGMS. In the meantime, religious literature and scientific studies both agree that mindfulness must involve two elements: present-awareness and non-judgmentalness (Bodhi, 2010; Young, 2013; Kabat-Zinn, 2003).

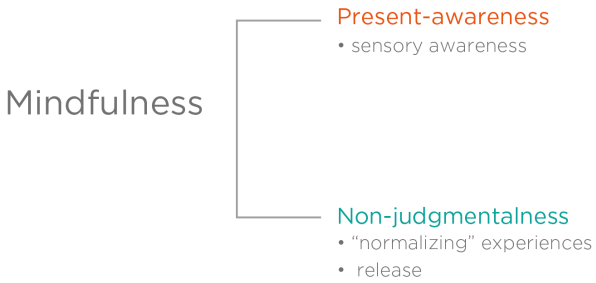


Fig. 4: Diagram of the elements of mindfulness. Image: Mariko Kuroda

PRESENT-AWARENESS

The earliest mentions of mindfulness describe it as a state of present-awareness. Theravada Buddhist monk Bhikkhu Bodhi explains the concept: "In the practice of Right mindfulness the mind is

trained to remain in the present, open, quiet, and alert, contemplating the present event." (Bodhi, 2010, p. 80). Present-awareness can be practiced through sensory awareness, or by heightening one's sensitivity to touch, sound, sight, taste, and smell. Thich Nhat Hanh, a Vietnamese Buddhist monk who was one of the prominent practitioners and teachers of mindfulness in the U.S. during the 60's, describes how one can experience the sky through the awakening the senses: "You can look at the sky and breath in, and you can say 'Breathing in, I am aware of the blue sky.'....It may be that you have lived 30 or 40 years but you have never seen and touched the blue sky that deeply" (Mindfulness Extended, 2011, 0:00-1:01). Mindfulness involves purposefully focusing on the present, both with the body and mind.

NON-JUDGMENTALNESS

Equally important to present-awareness is the role of non-judgmentalness. Megan Cowan, co-founder of Mindful Schools, explains non-judgmentalness as "normalizing" the spectrum of experiences instead of labeling them as "good" or "bad" (Mindful Schools, 2017a). In her online course for K-12 educators she says, "The ultimate goal of mindfulness is introducing us to our entire spectrum of experience and learning how to recognize that and be with it. And that means that we want to be able to be aware of, or be present with, or be mindful of our emotions that we would normally identify as 'wrong' or 'bad' and meet them as just something that's just occurring right now" (Mindful Schools, 2017a, 23:59-24:24). Non-judgmentalness means to accept all experiences—even so-called "negative emotions" such as frustration, anger, fear, and sadness—with an attitude of openness and curiosity, rather than avoiding or resisting them.

While Cowan describes non-judgmentalness as a form of acceptance, ordained monk and neuroscience research consultant Shizen Young equates it with a state of "release". In his essay "What is Mindfulness?" he writes, "Let visual, auditory, or somatic experiences come and go.... As soon as something wants to arise, let it. As long as something wants to last, let it. As soon as something wants to pass, let it" (Young, 2010, p.26).

Although Cowan and Young's definitions of non-judgmentalness appear contradictory at first glance, they in fact illustrate two stages of emotional "flow" where one allows emotions to enter and leave them. No longer enslaved by concepts of "bad" or "wrong" experiences, mindfulness practitioners are able to acknowledge their emotions and ultimately let them go without feeling the urge to fight or react against them (Bodhi, 2010, p.82).

The explicit training of present-awareness and attitude of non-judgmentalness that mindfulness offers have gripped the attention of educators who teach self-regulation (Meiklejohn et al., 2012; Rempel, 2012; Saltzman & Golding, 2008).

Of special interest to K-12 educators is how mindfulness brings attention to sensory experiences. Chris McKenna of Mindful Schools understands present-awareness as recovering "felt sense", or sensory awareness (Mindful Schools, 2017b, 3:59-4:24). In his online course, he raises an important question: "If you don't know where an emotion starts, how well can you manage it?" (Mindful Schools, 2017b, 4:56-5:01).

For example, imagine that a child tears a favorite drawing by accident. Before any emotions arise, that child may experience physiological responses such as a faster heart rate or a warming face. When such bodily responses go unacknowledged, the child may react impulsively, perhaps through yelling or crying. By tuning into their "felt sense", however, the child can recognize present physiological sensations and capture emotions such as "I'm feeling angry," or "I'm feeling sad". This moment of self-awareness thus creates a "pause" where the child meets their emotions and decides on a productive response to the situation, such as taping the drawing back together. As this example illustrates, mindfulness interrupts impulsive behaviour by introducing an opportunity for self-awareness and decision-making, thereby nurturing self-regulation.

EXISTING MINDFULNESS INTERVENTIONS IN SCHOOLS

Several studies on mindfulness interventions in classroom settings have demonstrated the benefits of mindfulness practices on children's self-regulation skills. In a study that conducted a yearlong mindful yoga intervention on 29 preschool children, Rachel A. Razza, Dessa Bergen-Cico and Kimberly Raymond (2015) from the department of Human Development and Family Science at Syracuse University found that children in the experimental

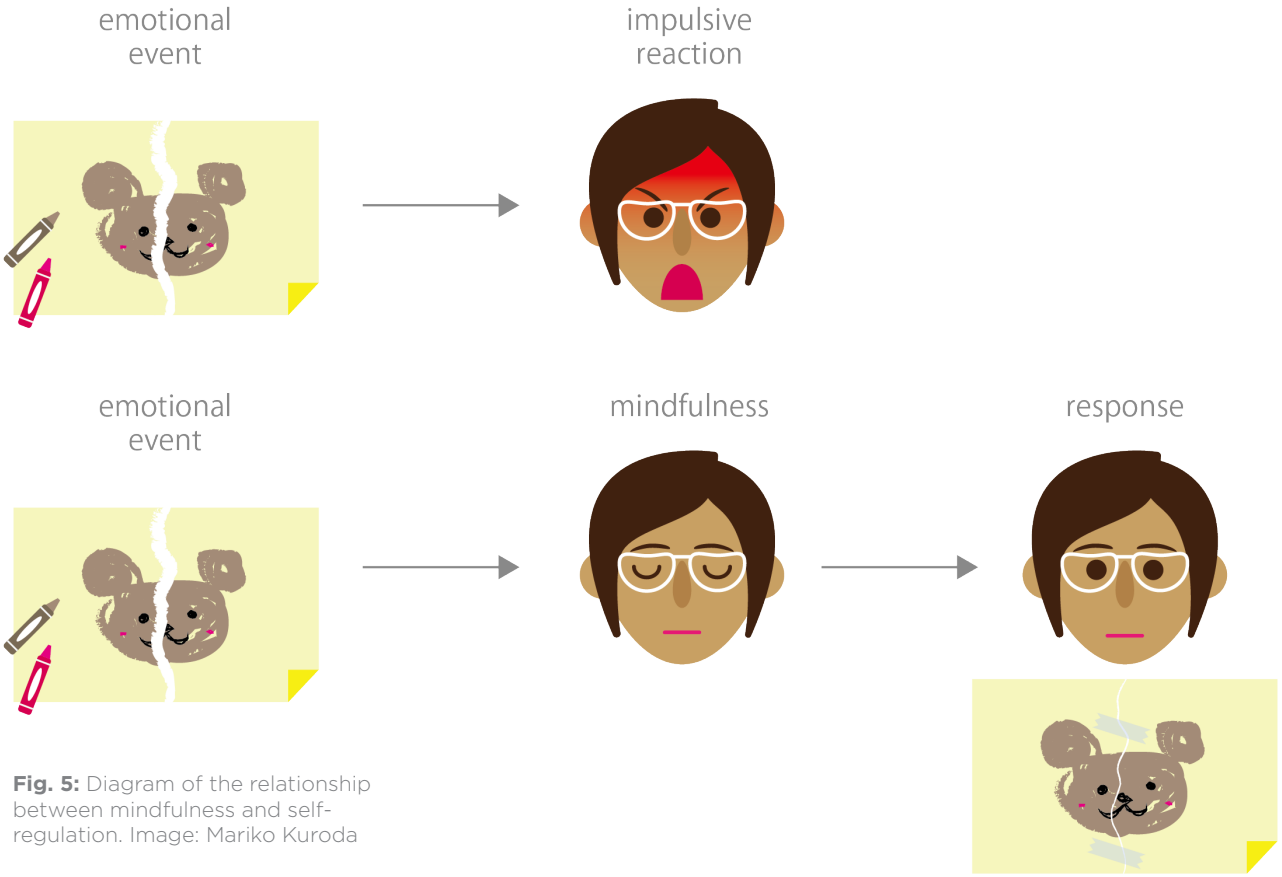


Fig. 5: Diagram of the relationship between mindfulness and self-regulation. Image: Mariko Kuroda

group scored higher on all three subscales of self-regulation (attention, inhibitory control, and delayed gratification) compared to those in the control group (Razza et al., 2015, p.380).

Karen Milligan and Flavia Spiroiu from the Department of Psychology at Ryerson University, together with Child and Family Therapist Paul Badali (2015) studied the effect of Integra mindfulness martial arts on 29 youths with learning differences aged 12-17. The program involved martial arts training in addition to sitting meditations. The results showed that both youths and their parents reported increased calmness, impulse control, self-understanding, communication ability, and tolerance (Milligan et al., 2015, p.569).

Findings from these studies suggest that students with learning differences, who have more difficulty with self-regulation compared to students without such diagnoses, may also benefit greatly from classroom mindfulness activities. However, mindfulness interventions such as yoga and martial arts require specialized training on behalf of the instructors. For example, of the three Mindfulness Martial Arts leaders of Milligan et al.'s study (2015), the first had 39 years of martial arts training, the second had 2 years of

Fig. 6: MDes students take part in an activity to express music through art as part of a workshop. Photo: Mariko Kuroda

practice in Brazilian Jiu Jitsu, and the third had 10 years of Aikido practice (p.566). Furthermore, mindfulness activities like sitting meditation demand high attentional capacities that younger students with learning differences struggle with. In sitting or breathing meditations, children are often not able to close their eyes or stay physically still for extended periods of time, and may repeatedly interrupt the session (Coholic, 2011, p.314). There remains a need for mindfulness practices that accommodate for the gifts and challenges of students with learning differences.

ART AND MINDFULNESS

This thesis project looks at art-making as a mode for mindfulness practice. Literature on art therapy reveals parallels between art-making and mindfulness, namely in their capacities to promote self-awareness and emotional understanding (Freilich & Shechtman, 2010; Dancevic, 2005; Bell & Robbins, 2007; Drake & Winner, 2013) . Art psychotherapists Malcolm Learmonth and Karen Huckvale (2008) from the NHS Trust elaborate, "Art-making demands presence in body, mind, feelings and, many would say, soul. It engages the whole person. Art making moves in and out of words, the thing made and our stories about what is made and how it came to be (p.11)." In the context of therapy, art is a means to explore present situations creatively and bring new perceptions to light (p.13).

Art therapist Marian Liebmann, who is known for her work with marginalized groups, lists many advantages of using art in therapy—three of which build a case specifically for using art to teach mindfulness to students with learning differences (Liebmann, 2004, p.8). Firstly, art is familiar. Almost all children have participated in art-making before, perhaps through drawing or painting. Secondly, art is a form of non-verbal and non-textual communication. As children with learning differences commonly struggle with spoken and written language, art provides a way for them to express and explore emotions that are not easily put into words. Lastly, art requires active participation (Liebmann, 2004, p.8). For students who have difficulty with attentional control, art-making is an engaging, enjoyable, and pleasurable way to focus on present experiences.

Studies in child development have researched the use of art as a mindfulness practice, namely through Holistic Arts-Based Programs (HAP). HAP refers to a series of arts-based mindfulness activities that teach children how to focus, be imaginative, recognize and understand their feelings, and nurture their strengths (Coholic, Eys & Lougheed, 2012, p.838). They are especially effective for young children and adolescents who may not have the abilities to participate in mindfulness practices that emphasize sitting and breathing meditation (Coholic, 2011, p.314). Art activities in HAP include drawing oneself as a tree to exercise self-awareness, and drawing feelings while listening to music (Coholic & Eys, 2016, p.7). Coholic and Eys (2016) reviewed studies on 77 vulnerable children (children who have been part of child welfare or mental health systems) who participated in 25 different HAP groups (p.3) and found that HAP leads to improved emotional regulation, mood, coping and social skills, confidence and self esteem, empathy, and ability to pay attention and focus (p.8).

That was a lot of reading all at once. Let's take a break, and breathe again.

Let's try something new
now. Bring your attention
to your ears. How many
sounds can you hear?
You might be reading
this in a quiet room.
But even in the quiet,
there are still sounds.
The hum of the air
conditioner. The crinkle
of your sleeve. The stroke
of your finger on the page.
Trace this line and listen.

so many things we notice
when we just pay attention.

"What does this say?"

Squatting by a boy's desk, the grade 1 teacher points to the word "bat" on a spelling worksheet. The boy tilts his head, rocking back and forth in his chair with his hands beneath his thighs.

"Look. Do this." The teacher stretches out her left arm. With her other hand, she touches her wrist. The boy pulls out his hands and mimics her.

The teacher purses her lips tightly, then releases them. "B-" she pronounces.

She moves her hand up, touching her elbow. She opens her mouth wide. "A-" she says.

Her hands climb to her shoulder. "T" she finishes, touching her front teeth with her tongue.

"B-A-T. B-A-T." Together, they repeat the movements and sounds.

"What does it say?"

"Bat," the boy answers.

"Good job!" The teacher rubs the boy's back as he copies the letters, planting them carefully onto the dotted lines.

KGMS is a "school of second choice" for students whose educational needs could not be met at their first choice of school. All students at KGMS possess average to superior intelligence, and meet the school's criteria for recognition of a learning difference (KGMS, (n.d.-a)).

While the range of learning differences represented at KGMS vary widely, common struggles include reading, spelling, and writing. To accommodate for the diverse abilities of these students, KGMS adopts the Orton Gillingham Method of teaching (KGMS, (n.d.-b)). The Orton Gillingham Method, an educational approach developed specifically for the needs of students with dyslexia, takes a multi-sensory approach to learning. Teachers at KGMS use kinesthetic, visual, and auditory modes to engage students in subject material.

Fig. 7: A painted rock by a grade 1 student. Students painted rocks to build their own bugs and to learn about insect anatomy. Photo: Mariko Kuroda

When I enter the grade 2 classroom, it is time for spelling. Rocking back and forth on their wobble stools, a class of about ten students cut and glue rhyming words. The blank rectangles on the worksheet reminds me of cribs in an empty hospital nursery.

A boy bounces his feet on an elastic band tied tautly to the front legs of his desk. His brows squeeze together, then spring apart suddenly as a timer goes off.

"Okay class, it's time for a body break!"

I watch from the back of the room as the grade 2 students rise from their desks. Typing just two letters into the search bar of her browser, the teacher swiftly pulls up a dance video from Youtube onto the whiteboard.

As the music begins, a herd of galloping students surrounds me. Giggles and smiles circle the room. The spelling worksheets flap gently in the spiraling breeze.

After two minute, the teachers pauses the video. The breeze comes to a rest as the children skip back to their desks, ready to lay each word into the right rectangle crib.

KGMS is also committed to whole-child development, and balances academics with Social Emotional Learning (SEL). SEL is the process of acquiring social and emotional skills ranging from empathy, managing emotions, building positive relationships, making responsible decisions, and setting goals (CASEL, 2019). KGMS places a great focus on self-regulation as a core competency within SEL (KGMS, (n.d.-b)). The school teaches "Zones of Regulations", a curriculum developed by occupational therapist Leah Kuypers, that categorizes emotions and levels of alertness into four colour categories (Kuypers, n.d.):

- Red describes extremely high levels of alertness, such as explosive rage, anger, or terror.
- Yellow describes elevated levels of alertness and emotion, such as frustration, anxiety, silliness, and nervousness.
- Green describes a state of calmness, where students are happy, focused, and ready to learn.
- Blue describes low levels of alertness, such as feeling sick, tired, or bored.

Most classrooms at KGMS have a "self-regulation area", or a separated area for students to self-regulate. Walls in these spaces are covered with pictograms called "Zone Pics" that suggest various exercises that promote self-regulation. For example, students in the "blue zone" can drink water, jump on a trampoline, or do jumping jacks to energize themselves and get to the "green zone." As students can get fatigued and lose focus during continuous seat work, teachers also schedule frequent "body breaks", or short sessions of physical activity during class time to raise students' energy levels and improve concentration. At their desks, many students carry fidget tools, or small handheld objects that support focus and attention.

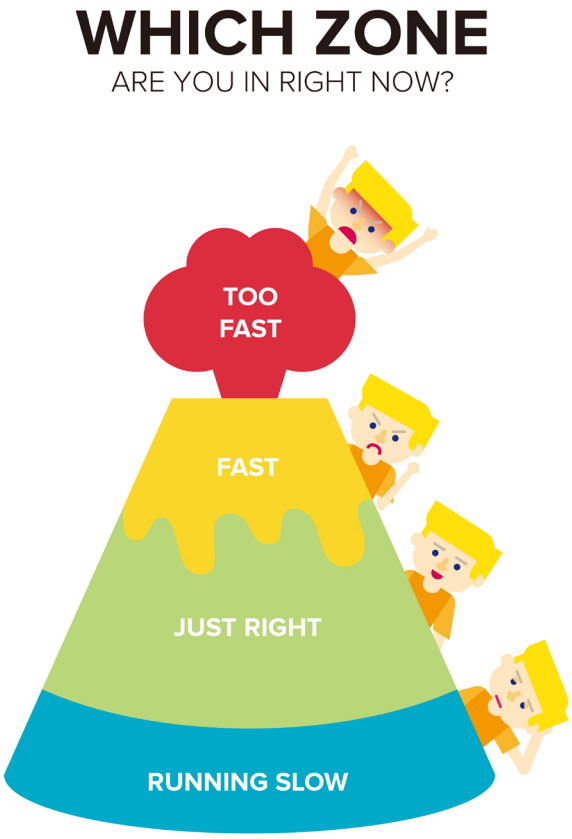


Fig. 8: A volcano graphic used throughout KGMS to represent the Zones of Regulation. Image: Mariko Kuroda

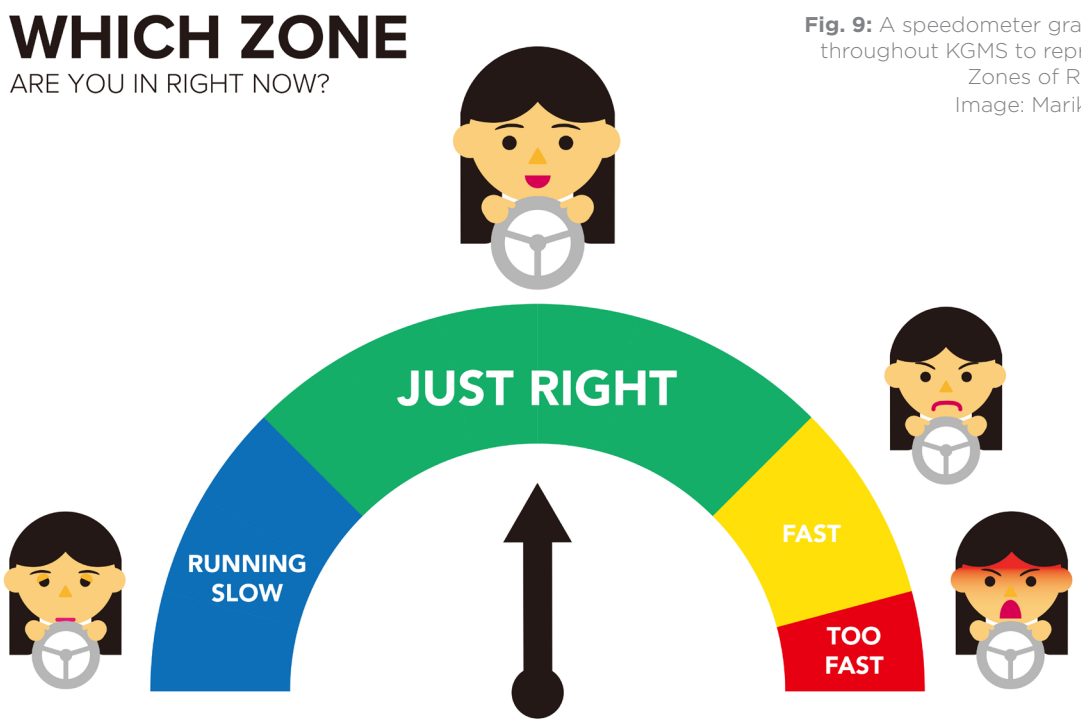


Fig. 9: A speedometer graphic used throughout KGMS to represent the Zones of Regulation. Image: Mariko Kuroda

KGMS students, especially in grades 1 to 7, look forward to eventually re-integrating into the mainstream school system. Unlike KGMS, these curriculums may not place equivalent emphasis on self-regulation. Through these many tactics, teachers aim to ultimately equip students with the ability to self-regulate without the guidance of an adult.

Of the various strategies that KGMS employs to facilitate self-regulation, however, mindfulness has not yet been explored as a potential tool. Teachers occasionally employ mindfulness-based techniques such as breathing exercises, but mindfulness as a concept is currently not taught. This thesis therefore looks at introducing mindfulness as a tool for self-regulation that students can continue to employ after they switch into mainstream schools.

Mindfulness carries certain benefits compared to other self-regulation taught at KGMS. For instance, mindfulness does not require special considerations of time, space, or equipment—unlike body breaks which may interrupt class schedules or require room and tools. Furthermore, while students may grow out of fidget tools and body breaks, mindfulness is a lifelong practice that students can carry on even after they complete school. By familiarizing students to mindfulness practices in their early years, this thesis aims to embed mindfulness into their lives as a tool for self-regulation.

Fig. 10: A self-regulation station outside the grade 2 classroom. Students use the self-regulation to do various physical activities when they need a break from class work. Photo: Mariko Kuroda

The present research is a case study aimed to develop tools for teaching mindfulness at KGMS. Therefore, the outcomes of this research are specifically tailored to the needs, desires, and values of students and teachers at KGMS.

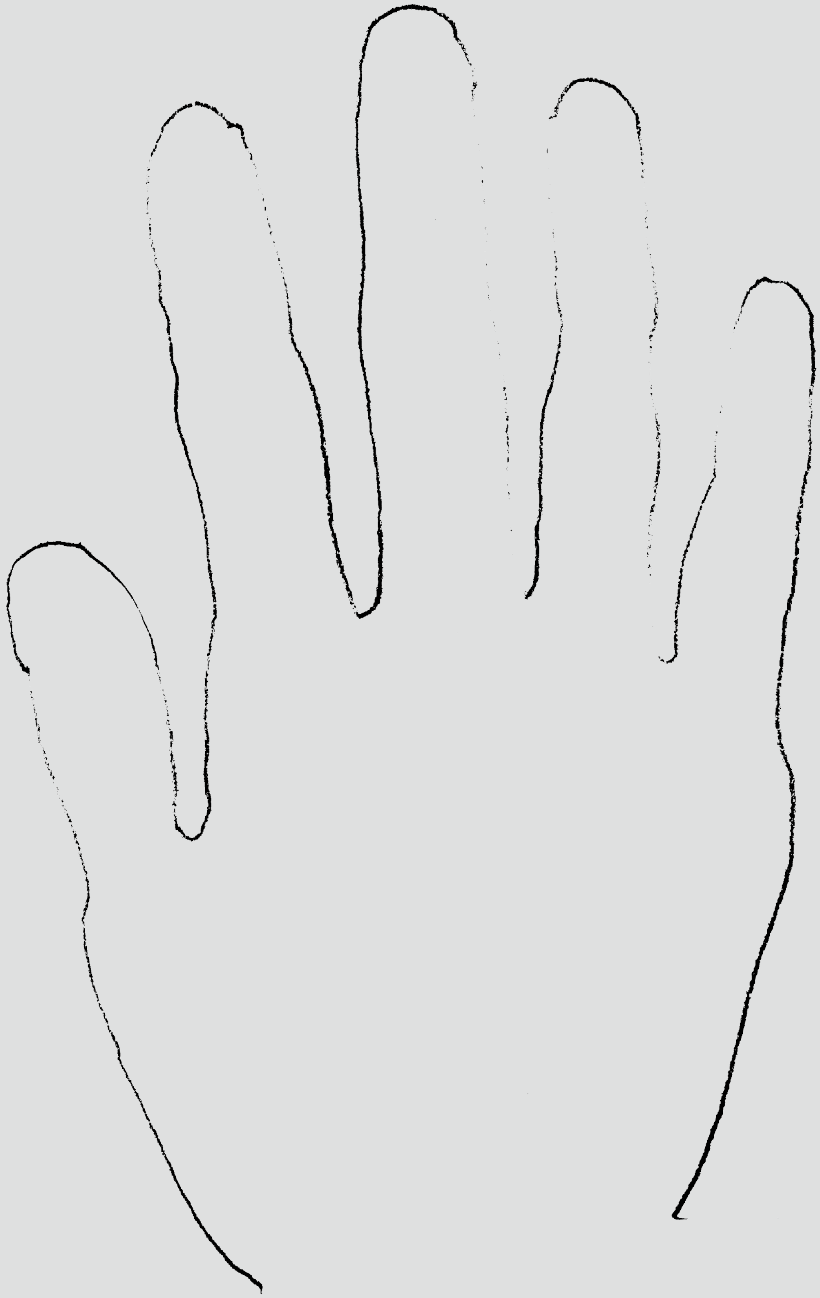
The purpose of this research is not to support the claim that art-making as a form of mindfulness improves self-regulation skills. While questionnaires and scales exist to measure self-regulation skills in the field of developmental psychology, I possess neither the knowledge nor expertise to use these instruments. Rather than the influence of art-making on self-regulation, however, of greater interest is the viability of art-making as a method for teaching mindfulness to KGMS students in grades 1-3. As a designer, I possess an understanding of the design process which allows me to generate a mindfulness tool that fits within the unique academic environment of KGMS. In the next section about methodology, I will expand on the strengths of the design process. The success of the thesis project will therefore be measured qualitatively through exit surveys with teachers.

While some co-creative methods were used as a strategy within the research, this thesis does not seek to contribute new knowledge on co-creation. Co-creational methods were determined to be unrealistic due to the limitations of working in school settings. For instance, scheduling co-creation workshops with students is difficult as workshops generally takes over entire class periods. Co-creation with teachers is equally challenging, as monthly professional development days are the only opportunities to organize workshops of substantial length with faculty. Furthermore, since this project aims to develop a mindfulness tool, students and teachers must hold some knowledge of mindfulness in order to hold meaningful co-creation workshops. While introductory sessions could have been held prior to co-creation workshops to familiarize participants with mindfulness, such sessions would again face constraints of time, and would also counter my objective to implement mindfulness through a specifically designed tool.

Despite these limitations, my research may offer insight to teachers seeking to teach self-regulation or mindfulness in the classrooms. The outcomes of my research may also offer insight to those studying art-making as a mindfulness practice outside the context of education and students with learning differences. The contributions of my research may extend to other designers working in school settings as well. I will elaborate further on these points in my conclusion.

Fig. 11: Painted rocks by grade 1 students. Photo: Mariko Kuroda
Fig 12: A fish made from leaves by a grade 3 student. Grade 3 students learned about how nature can be used in different ways. Photo: Mariko Kuroda

Now you're halfway through the document. It's time to check-in with yourself.
How are you feeling?
What do you need right now in order to keep reading?
Maybe have a sip of water.
Maybe take a stretch.
Put your hands here and push this paper as far away from yourself as possible. Let's get ready for the next half of the thesis.



This thesis employed the design process, a problem-solving method used by designers to break down complex issues into smaller and manageable problems that can be addressed (Engholm & Norup, 2017, p.17).

The design process involves five-steps (Hasso Plattner Institute of Design, 2010):

1. Empathize: The first stage is to gain a comprehensive and empathic knowledge of the problem to be solved. The designer observes and engages with people who are related to the problem to develop a deep understanding of the area of concern.

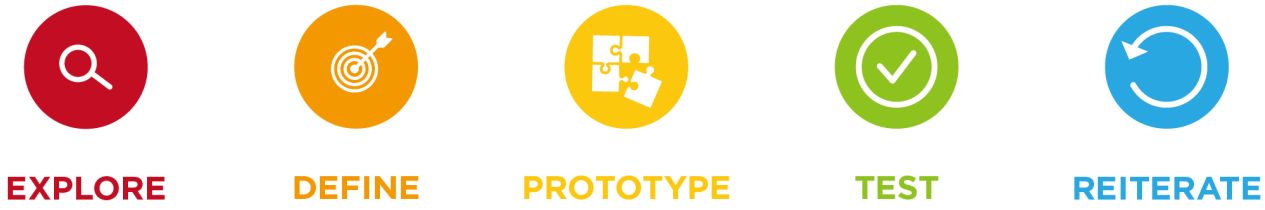
2. Define: The designer analyzes and synthesizes findings from the first stage to identify the core problems to be solved.

3. Ideate: Based on the defined problems, the designer generates ideas of possible solutions and products.

4. Prototype: The designer creates low-fidelity versions, or prototypes, of possible products devised in the Ideate stage. Prototypes reveal possible problems within products, and give designers a better idea of how users may engage with them.

5. Test: The product is tested by users or other evaluators to assess its efficacy in solving the defined problem. Based on the results of the testing, the product can be refined further in an iterative process.

Fig. 13: Diagram of design process.
Image: Mariko Kuroda



To parallel the progress of my secondary research, my thesis adapted the general design process to follow these five steps:

1. EXPLORE

In this stage, I explored and investigated the problem space. In tandem to my secondary research on mindfulness, I generated various prototypes of mindfulness tools to explore the concept of mindfulness and how it could be practiced in a classroom setting. I employed autoethnographic research methods to immerse myself in a personal practice of mindfulness. To gain an empathic understanding about the educational environment at KGMS, I interacted with teachers and students through ethnographic and participatory design research methods.

2. DEFINE

Based on findings from the first stage, I identified the design criteria for a mindfulness tool for KGMS students.

3. PROTOTYPE

Reflecting on the prototypes generated in the first stage and the defined design criteria, I prototyped a mindfulness tool for KGMS students.

4. TEST

Prototypes of the mindfulness tool were user tested by KGMS students.

5. REITERATE

Based on teacher feedback from the initial user testing, I refined the design of the prototype for a second round of user testing.

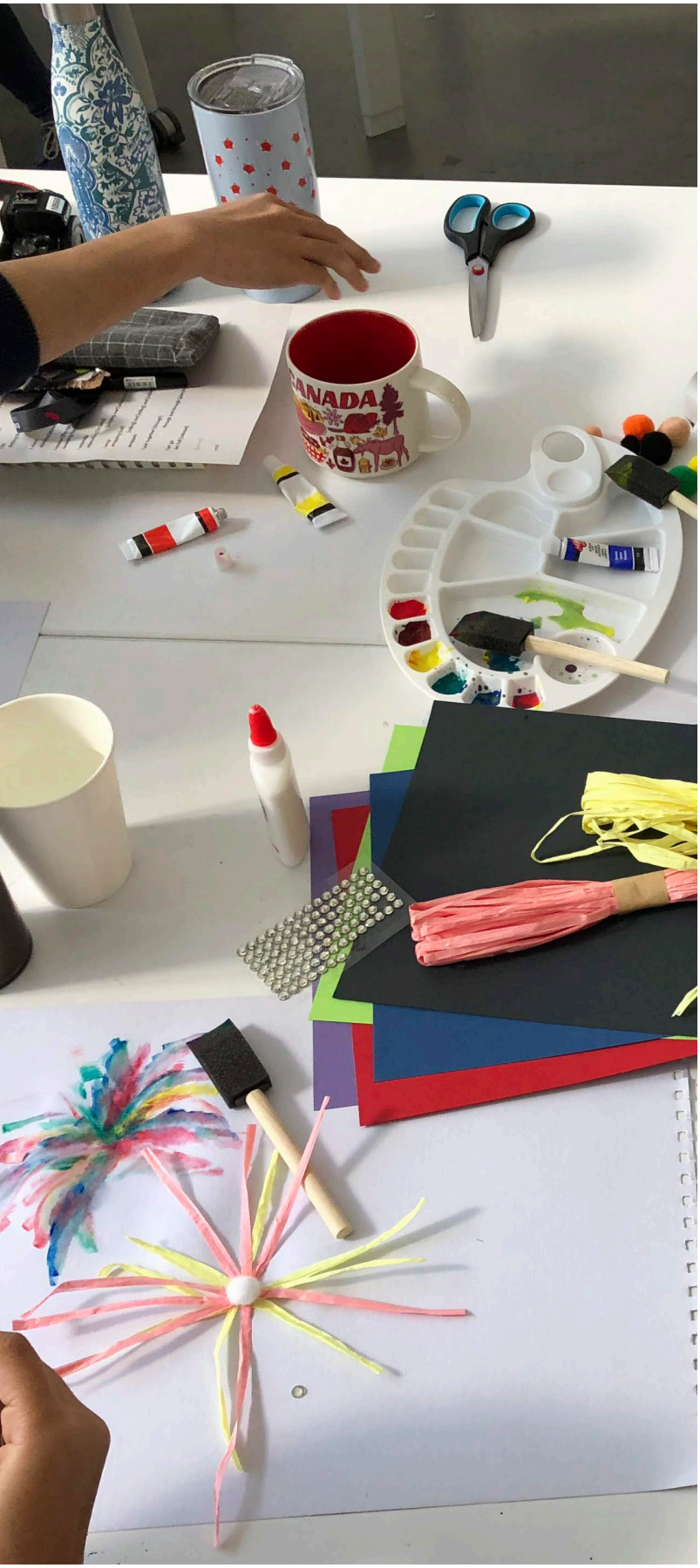


Fig. 14: MDes students take part in an activity to express music through art as part of a workshop. Photo: Mariko Kuroda

The value of the design process in this project was threefold. Firstly, the exploratory aspect of the process offered a platform for me to creatively investigate the topic of mindfulness. To supplement my secondary research on mindfulness, I designed numerous prototypes of mindfulness tools to research the diverse ways to understand and engage in mindfulness practice. The process encouraged me to explore beyond orthodox educational tools such as worksheets and posters.

Secondly, the design process' emphasis on empathy allowed me to gain a comprehensive perspective of the academic culture at KGMS. I used participatory design research methods to actively engage with KGMS teachers and students, and gain a deep knowledge of their needs, wants, and values. The focus on empathy also motivated me to begin a personal mindfulness routine, so that I would have first-hand experience of the benefits and challenges of practicing mindfulness.

Thirdly, the cyclical nature of the process validated the design of the final product. Iterative testing and refinements allowed me to deliver a final product that effectively addressed the needs of KGMS students and teachers.

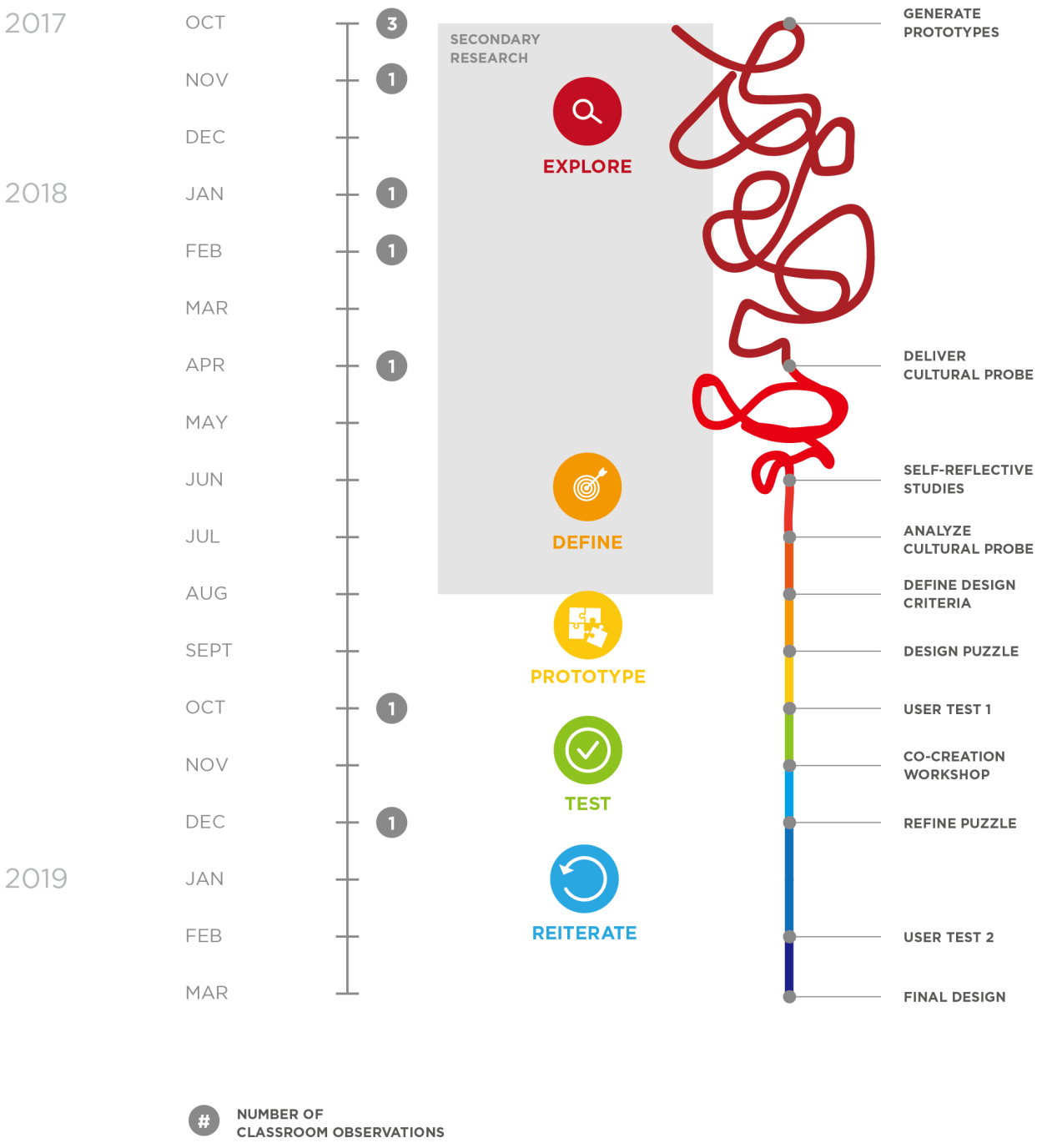


Fig. 15: Timeline of research activities.
Image: Mariko Kuroda

1. Explore

In the first phase of my research, I explored two topics:

1. Mindfulness

2. The academic environment of KGMS

EXPLORING MINDFULNESS: GENERATIVE DESIGN RESEARCH

While conducting secondary research on mindfulness, I explored multiple ways of engaging young students in mindfulness practice by generating many prototypes of mindfulness tools. At the beginning of this stage, I did not specifically focus on art-making as a mode of mindfulness practice. I decided to take this approach towards the end of this exploration and through my self-reflective study, which I will explain in a following section. The objective of this stage was to propose diverse ways for students to practice mindfulness in the classroom.

From my experience as an instructor for students with learning differences, I observed that young students enjoy physical activity. Therefore, my studio work through September to December 2018 investigated ways to practice present-awareness through the body-awareness, or an intentional focus on body sensations. As a communication designer working mainly in print, I developed an interest in laser cutting technology, which outputs two-dimensional designs into three dimensional objects. Using laser cutting, I designed a series of tools for children to practice present-awareness with their bodies.

Flamingo Stand

My secondary research on mindfulness led me to the topic of yoga, a traditional meditative exercise that promotes body awareness through a series of poses. Maintaining balance in yoga poses requires focus on body alignment. From this, I explored relationship between mindfulness and balance by designing the Flamingo Stand. This was a set of circular platforms for students to balance on with

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Fig. 16: Flamingo Stand. Photo: Mariko Kuroda **Fig. 17:** An MDes student using the Flamingo Stand. Photo: Mariko Kuroda

Fig. 18: Don't Wake The Elephant. Photo: Mariko Kuroda **Fig. 19:** Close up of bird in Don't Wake The Elephant. Photo: Mariko Kuroda

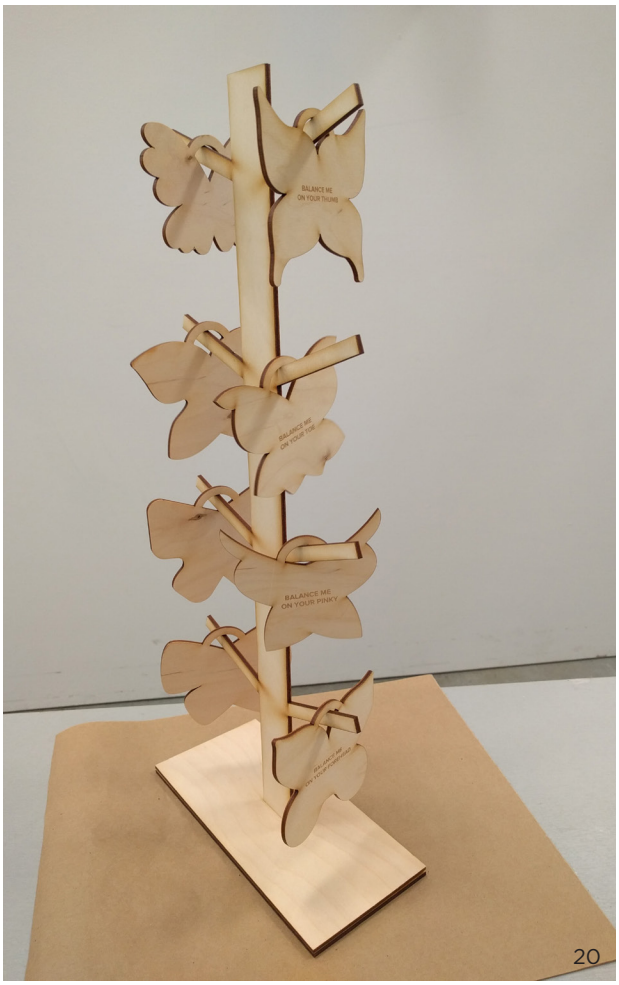
one leg, like a flamingo. The purpose of the tool was to challenge students to focus on their body orientation. I imagined this tool to be used in self-regulation areas at KGMS.

Don't Wake the Elephant

After this, I developed interest in practicing mindfulness through the individual senses, beginning with hearing. I designed Don't Wake the Elephant, a game that features a sleeping elephant and a bird attached to a bell. The objective of the game is to move the bird along a rail without making sound, or "waking the elephant". I envisioned this tool to be another addition to the self-regulation area. The exercise stimulates auditory awareness, as well as body-awareness by pushing students to pay attention to body parts — such as their fingers, arms, and legs — through slow movement.

Mystery Box

Continuing my exploration with the senses, I built the Mystery Box as a investigation into tactility. The Mystery Box contains 14 laser cut pieces shaped as animals including a kangaroo, mouse, fish, camel, and horse. The game challenges students to pick a piece from the box and guess the animal without looking. Through this tool, I hoped to draw students' attention to their sense of touch. This box could be used as both a group or individual activity for self-regulation.



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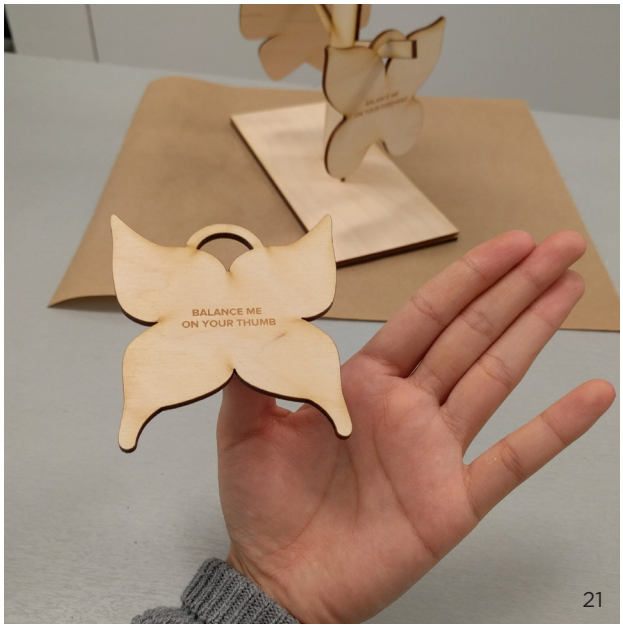

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Fig. 20: Butterfly Balance. Photo: Mariko Kuroda **Fig. 21:** Close up of Butterfly Balance. Photo: Mariko Kuroda **Fig. 22:** Mystery Box. Photo: Mariko Kuroda

Butterfly Balance

In this stage of my secondary research, I learned about body scanning, a traditional mindfulness exercise that brings awareness to physical sensations in different body parts. Typically, a body scan starts from one end, such as the head, and progressively moves to throughout the rest of the body. While the Flamingo Stand and Don't Wake the Elephant stimulated awareness of the whole body through balance and movement, I became interested in designing a tool that focused on specific body parts. To reflect this, I designed the Butterfly Balance tool. Each butterfly names a body part that the child should balance it on. The tool intended to help children focus on various body parts that they may not pay attention to regularly, such as the elbow, knees, toes, and heel. Similar to the Mystery Box, this could be used as both a group or individual activity for self-regulation.

Fig. 23: Breathing Stone activity from *Mindful Crafts*. Image: Mariko Kuroda

Craftbook

While designing the Butterfly Balance tool, I recognized a possibility to translate it into a paper craft activity for students to color and cut out their own butterflies. This led to an idea for Mindful Crafts, a mindfulness activity crafts book containing crafts of mindfulness tools. Such a book could open the possibility of integrating mindfulness with the arts education curriculum at KGMS. I devised craft ideas based on traditional mindfulness exercises such as breathing and body scanning. Some included crafts were:

- Swimming Jellyfish: In this craft activity, students craft jellyfish with dangling legs that move with the breath. Provided with an illustration of the jellyfish's body, students can use ribbons and ropes to create its legs.
- Breathing Stone: In this craft activity, students paint rocks to place on their stomachs during a breathing exercise.
- Magic Wand: In this craft activity, students build wands to use to point to different body parts during a body scanning exercise.

Upon inviting several classmates to participate in the craft activities from the book, I recognized that the activity of craft making itself fostered moments of mindfulness. Colleagues commented that the act of making with their hands helped them focus on what was happening in the present, and offered a sense of calmness. Their remarks inspired me to further examine the relationship between art-making and mindfulness through a personal practice.

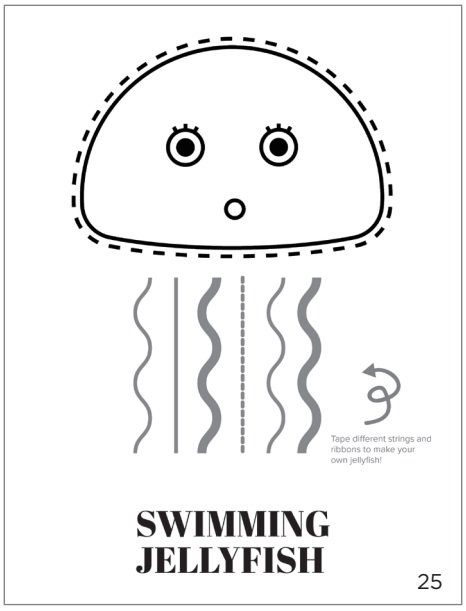
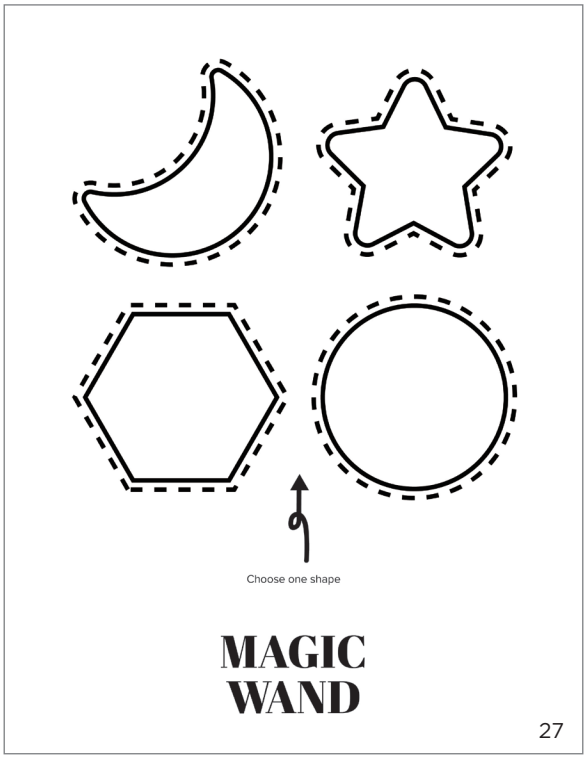
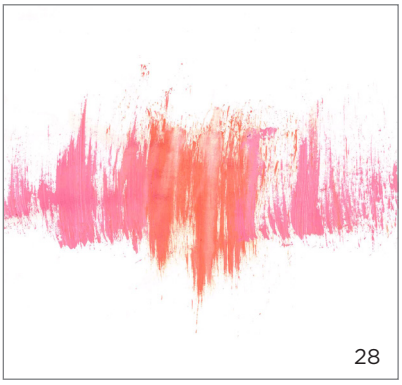


Fig. 24 & 25: Swimming Jellyfish activity from *Mindful Crafts.* Image: Mariko Kuroda **Fig. 26 & 27:** Magic Wand activity from *Mindful Crafts.* Image: Mariko Kuroda





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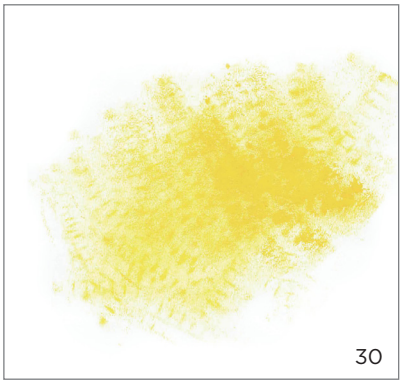

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EXPLORING MINDFULNESS: SELF-REFLECTIVE STUDIES

To gain understanding of the relationship between art-making and mindfulness, I engaged in daily sitting meditation practice for one month in June 2018. The practice involved two parts. Firstly, I conducted a 3-minute breathing exercise using Headspace, a mobile application offering audio of guided meditation sessions. Secondly, I painted an artwork using watercolour paints that reflected on the day's meditation.

Findings from Self-Reflective Studies

My own experience with mindfulness using Headspace revealed the importance of consistency in practice. Throughout my breathing exercises and paintings, I encountered a spectrum of bodily sensations and emotions: from contentment, to anger, to exhaustion, to frustration. The act of visually expressing my own mindfulness experience opened my eyes to the vast range of feelings my body contained. Meeting each emotion with non-judgmentalness was a challenge. However, I learned to welcome and appreciate these feelings as inspiration for my paintings, and let them go with each new blank paper in my sketchbook. Ultimately, the daily "practice", or repeated exercise of mindfulness, helped me cultivate an attitude of equanimity towards my emotions. While I initially doubted my own commitment to a month-long daily mindfulness practice, the ease and pleasure of watercolour painting motivated me to continue it every day. Through this experience, I recognized the value of short and easy art-making activities that can be practiced on a daily basis.

Fig. 28 to 35: Watercolor paintings from self-reflective practice.
Image: Mariko Kuroda


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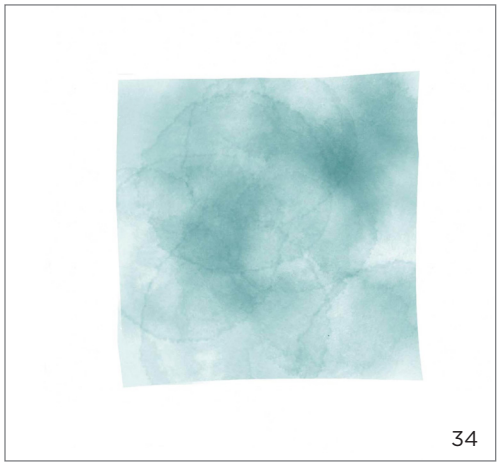
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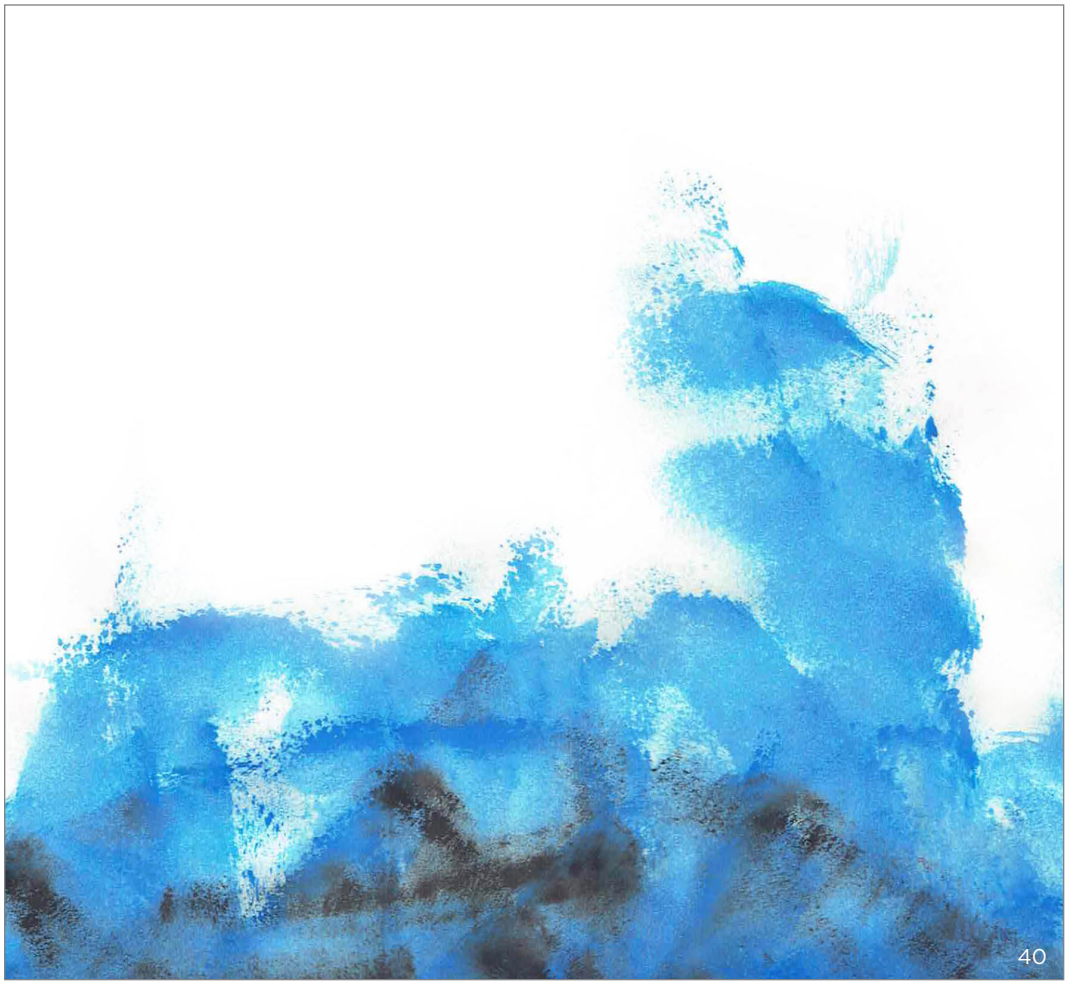
Fig 36 to 40: Watercolor paintings from my own mindfulness practice. Image by Mariko Kuroda



To understand the academic environment at KGMS, I conducted the following research activities:

1. Classroom observations
2. Cultural probes

EXPLORING KGMS: CLASSROOM OBSERVATIONS

Through October 2017 to December 2018, I visited the grades 1-3 classrooms for half-day observations. I carried out a total of nine observations (five with grade 1, and two each for grades 2 and 3). The objective of the classroom observations was to learn how self-regulation was currently taught in these classrooms.

Findings from classroom observations

The observations revealed the many tactics that are put into place to help students regulate their energy to be "ready to learn". During the school day, teachers constantly revise class plans to meet their students' energy levels, inserting frequent body breaks throughout the day. Classrooms are equipped with fidget tools such as putty, elastic bands, glitter bottles, chewellery (chewable jewellery), and fidget spinners for students to use at their desks when they need to release excess energy. A variety of seating types, such as wobble stools and yoga balls, are also provided. In the classrooms' self-regulation stations, teachers pointed out that visual aids such as the Zones of Regulation and Zone Pics are vital for students who have difficulties with textual information.

These observations suggested that tools that are used on individual need-basis are not needed in an environment that is already saturated with self-regulation tools. Proposing tools such as the Flamingo Stand, Don't Wake the Elephant, Mystery Box, and Butterfly Balance, which were mainly designed for individual students to use in self-regulation areas, would create redundancy.

Fig. 41: A wobble stool in the grade 2 classroom. Photo: Mariko Kuroda

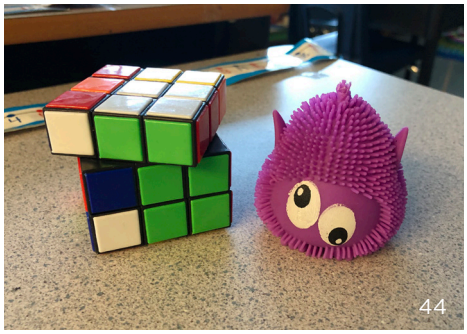


Fig. 42: A bucket of fidget tools such as a glitter wand and stress balls from the grade 3 classroom. Photo: Mariko Kuroda **Fig. 43:** A basket of fidget tools such as elastic bands and sponges from the grade 2 classroom. Photo: Mariko Kuroda **Fig. 44:** A rubik's cube and squeeze toy used by a student in grade 1. Photo: Mariko Kuroda

EXPLORING KGMS: CULTURAL PROBES

In April 2018, I delivered a culture probe to each of the grades 1-3 teachers. Cultural probes are tools designed to elicit responses from participants that help researchers understand their cultural environment (Gaver, Dunne, & Pacenti, 1999, p. 22). Designers use cultural probes to facilitate conversations with participants and gain valuable insight into their needs and values (Crabtree et al., 2003, p.8). While cultural probes may come in many forms, examples include (Gaver, Dunne, & Pacenti, 1999, p. 23):

- Postcards where participants answer questions on their attitudes towards their cultural environment
- Maps where participants mark important areas in their cultural environment
- Photo albums for participants to collect memorable objects that tell narratives of their lives

Although classroom observations offered valuable information on how teachers assist their students with self-regulation in reality, my cultural probes were designed to learn more about the values and ideals teachers hold in teaching self-regulation. At KGMS, each grade is taught by two co-teachers, so a total of six probes were delivered. Four were returned in June 2018 (Two from grade 2, and one each from grade 1 and 3). The probes included five activities:

Fig. 45: Title page of cultural probe activity book. Image: Mariko Kuroda

1. Mindfulness Bracelet: Teachers were asked to wear a bracelet made of two rows of bubble wrap for one school day. Teachers popped the bubbles on one row when they felt negative emotions, and popped the bubbles the other row when they felt positive emotions. The role of the bracelet was to help teachers be mindful of their highs and lows throughout the day. At the end of the school day, teachers wrote down as many instances as they could remember of when they popped their bubble wrap bracelets.

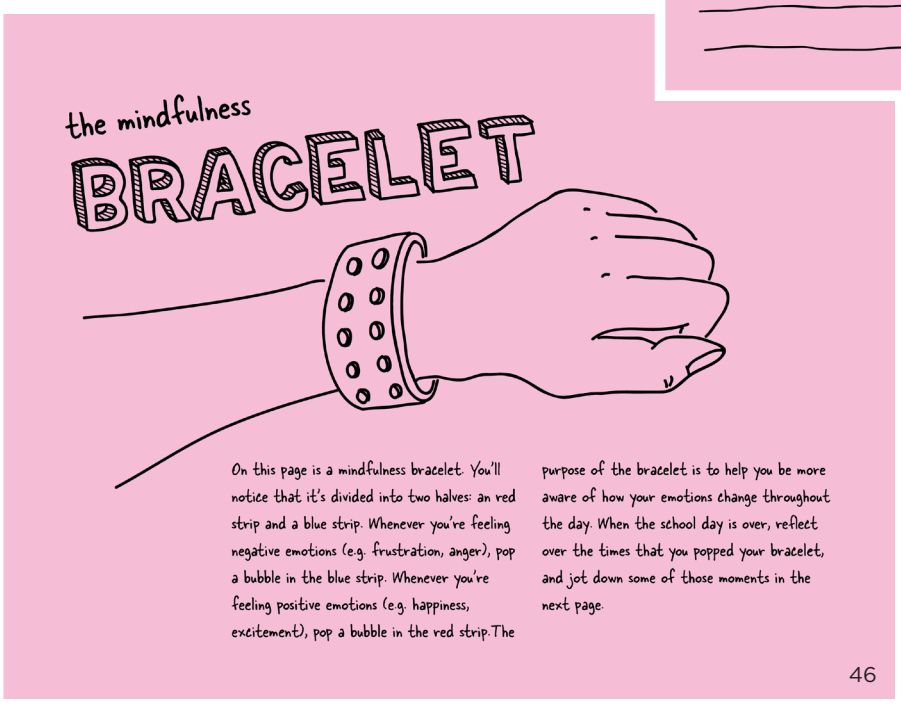
2. SEL Super Student: Teachers named the three top "superpowers" or skills of an SEL Super

Student, or a model student who exemplifies high social-emotional competence.

3. Self-Regulation Tools: Teachers listed resources and tools they used inside the classroom to help students self-regulate.

4. What Do You Say?: Teachers were given four scenarios of students in different emotional states (angry, sad, distracted, and tired). Teachers filled in empty speech bubbles with responses they would give to help each student be ready to learn.

5. It's Time for Art: Teachers listed topics and activities they have done with their class as part of arts education.



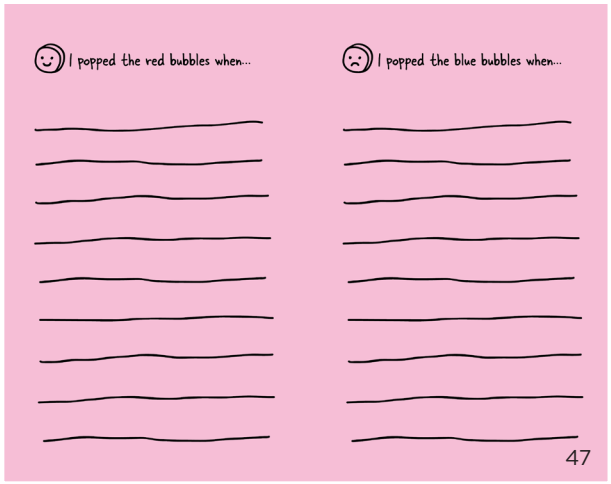
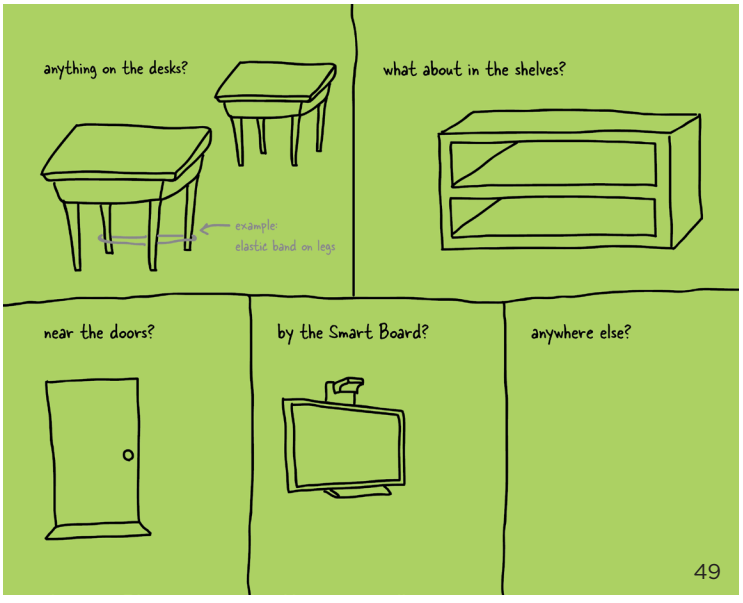


Fig. 46 & 47: Mindfulness Bracelet activity from cultural probe. Photo: Mariko Kuroda



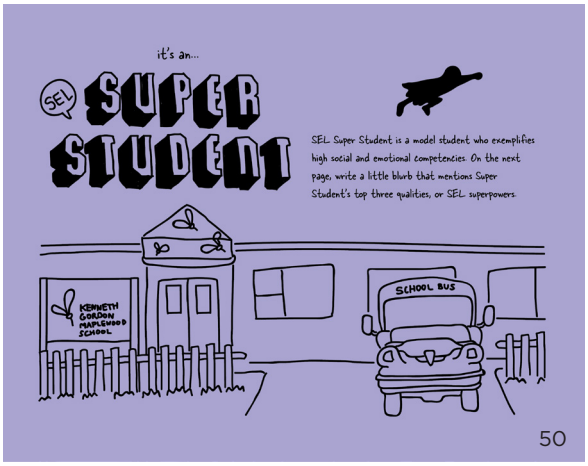
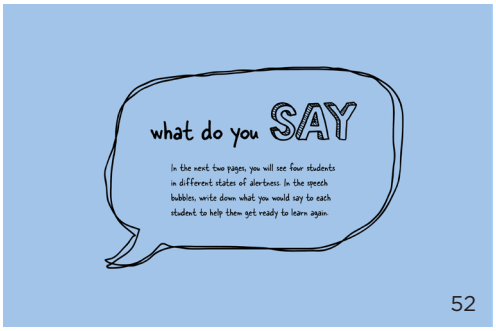
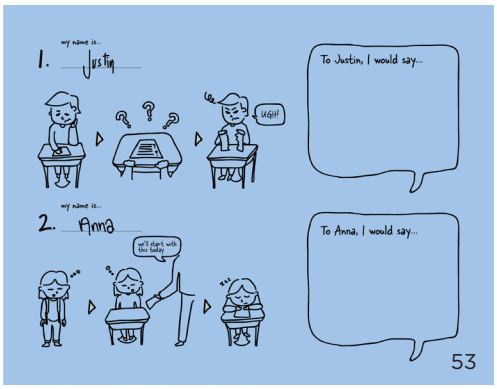
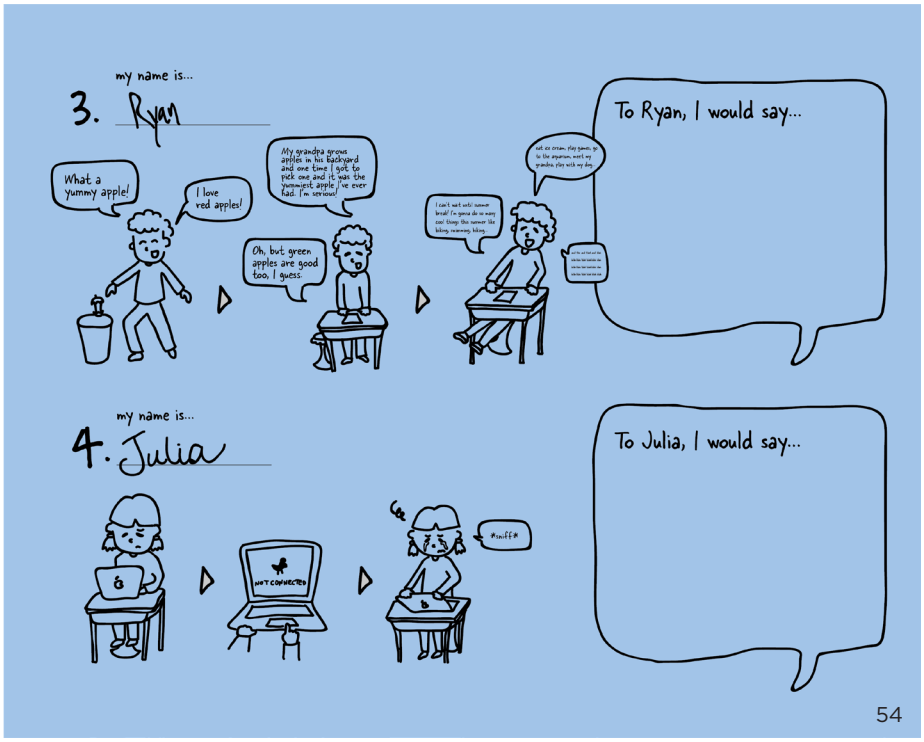
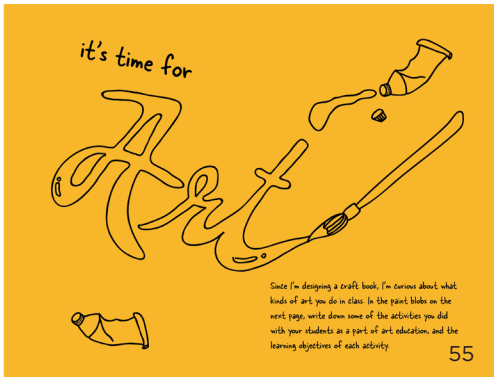


Fig. 48 & 49: Self-Regulation Tools activity from cultural probe. Images: Mariko Kuroda **Fig. 50 & 51:** SEL Super Student activity from cultural probe. Images: Mariko Kuroda









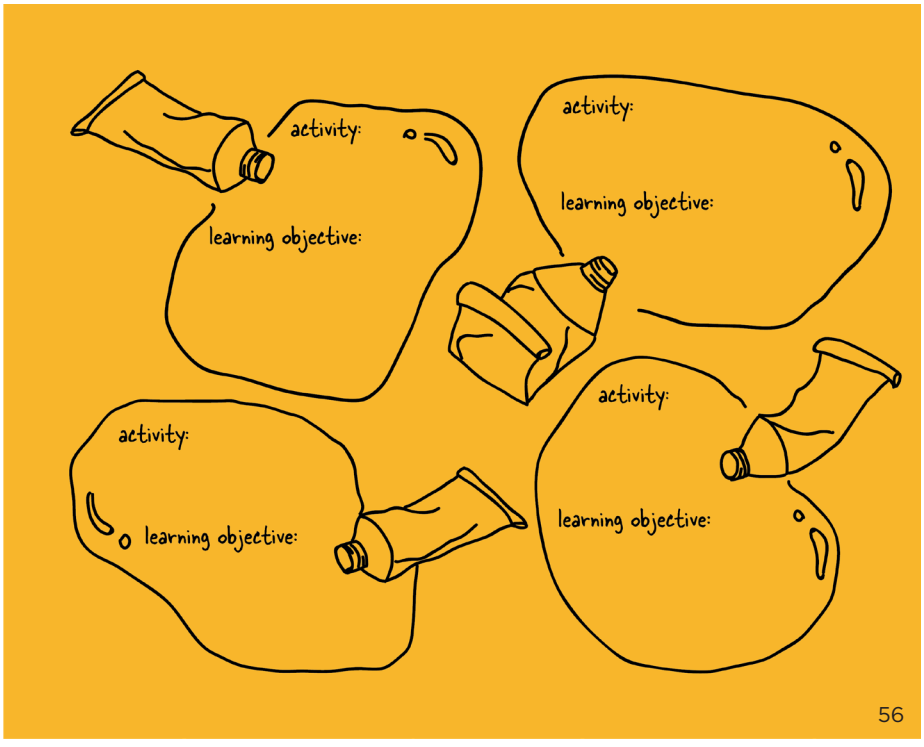
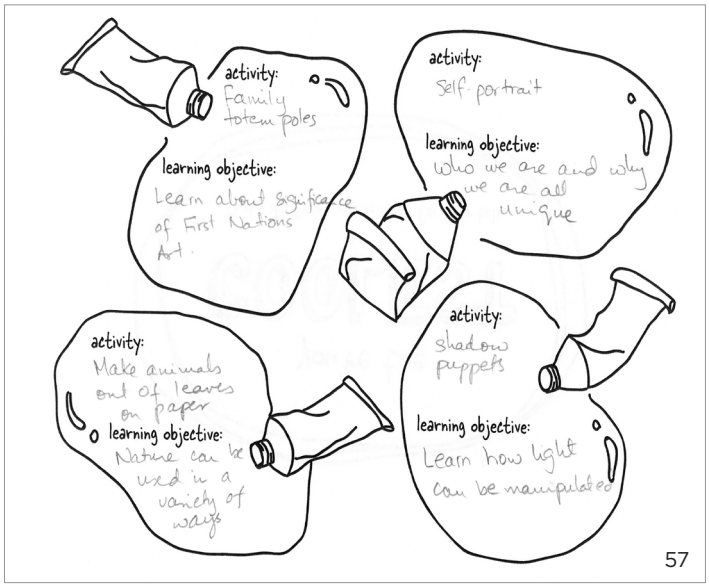


Fig. 52 to 54: What Do You Say activity from cultural probe. Images: Mariko Kuroda **Fig. 55 & 56:** It's Time for Art activity from cultural probe. Images: Mariko Kuroda

Findings from Cultural Probes

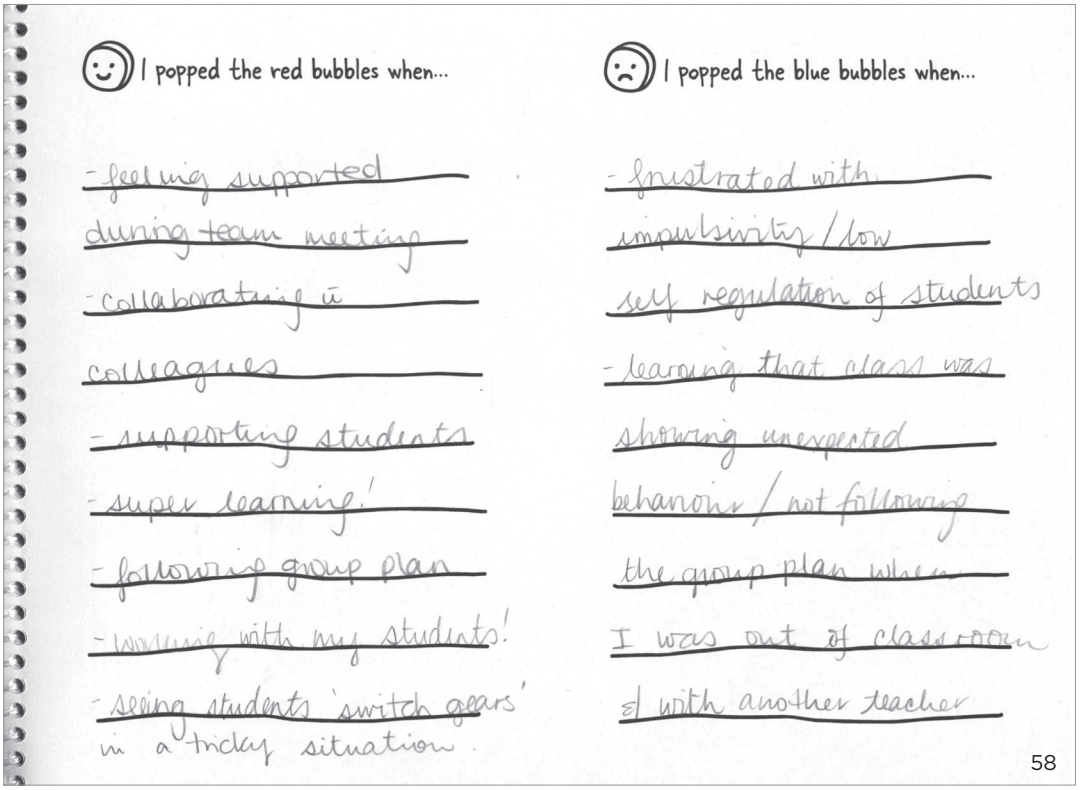
In the probes, teachers expressed how self-regulation is vital for students to follow the "group plan", or class instructions. In the Mindfulness Bracelet activity, two teachers reported that one of the "lows" during their days was when students showed unexpected and impulsive behaviour that did not follow the group plan. One teacher listed the ability to "show flexible thinking, especially when it comes to unpreferred activities", as one of the top three skills of an SEL Super Student. Teachers desire for students to be able to identify and regulate their emotions through taught strategies, so that they can shift from following their "own plans" to engaging in planned class activities.

The probes showed that the two main roles of the teacher in teaching self-regulation were to help students identify and label their emotions, and to propose strategies for self-regulation. Many of the responses to the "What Do You Say" activity began with the phrase "I can see that you are…", which named the students' emotional state, and a suggestion of an activity. For example, in a scenario with a tired student, a teacher wrote "I can see you're tired. What does your body need right now? Go have a drink of water and I'll meet you at the Regulation Station to wake your body up."



In terms of arts education in grades 1-3, teachers utilized art to further learning in other subject areas. For instance, teachers had students create family totem poles as a lesson on the significance of First Nations Art. Other activities involved making shadow puppets to learn how light can be manipulated.

Through my self-reflective studies, I learned that the benefits of mindfulness are experienced from regular practice. While a mindfulness craftbook may offer lesson ideas for some weeks, most lesson plans will parallel with topics from other class subjects. Because art classes are also taught only once a week, I decided that arts education would not be the best channel by which to introduce a consistent mindfulness practice to grades 1 to 3.



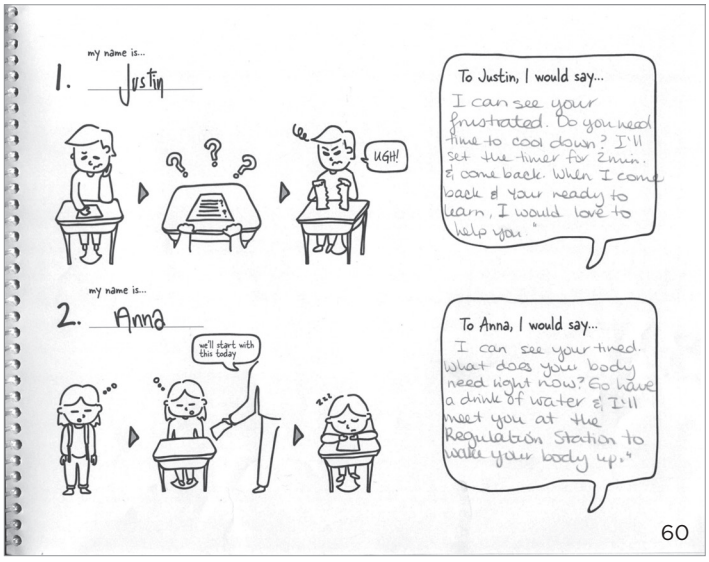


Fig. 57 to 60: Responses to cultural probe activity book from grades 1-3 teachers. Images: Mariko Kuroda

* All responses to cultural probes can be seen in Appendix 1.

2. Define

In this stage, I analyzed the data from my primary research to identify the criteria for a successful design intervention that will engage KGMS students in mindfulness practice.

The data collected through my primary research on the academic culture at KGMS reflects a clear value in teaching mindfulness to grades 1 to 3 students, as teachers seek to train students to identify and regulate their emotions. My generative explorations on mindfulness proposed art-making as a way to engage young students in mindfulness practice. Based on this, I identified the five criteria for a successful art-making tool that introduces mindfulness to KGMS students:

GROUP-BASED ACTIVITY

The tool should be used as a whole-class activity, since classrooms are already saturated with self-regulation tools for individual use. It will also be an opportunity to practice abiding by the "group plan".

FLEXIBILITY

For mindfulness to be adopted as a consistent practice in the classroom, it should work flexibly with regular curricular programs. This means that it should not disrupt already existing curricular plans or require additional preparation from teachers.

EASE OF USE

Ease of implementation is also key for teachers without formal training in mindfulness to be able to lead the practice with confidence. Instructions on how to use the tool should be communicated in simple language.

SAFETY OF MATERIAL

Students who will be using the mindfulness art-making tool are between the ages 5 to 10. Therefore, the tool should be made of materials that are not hazardous if a student were to attempt to eat it. Parts of the tool should not be too small to pose a choking hazard. To avoid injuries, the tool should not carry any sharp, heavy, or hard features in case it is thrown or misused by students.

MENDABLE

As the tool is projected to be used by students over several years, it should be easily fixable by a student or teacher in the event that it breaks.

3. Prototype

In this stage of my research, I worked to develop a prototype of a mindfulness art-making tool based on the design criteria identified from the previous stage.

In this stage of my research, I worked to develop a prototype of a mindfulness art-making tool based on the design criteria identified from the previous stage. To avoid interfering with existing curricular plans, I identified "flexible" periods during the school day where teachers did not have lesson plans. Transition times, such as before the first morning bell, after recess, and after lunch, were gaps during the day where teachers gave students free time to cool-down. Teachers often dedicated this time to silent reading.

Researchers in the field of special education advocate for the practice of transitional routines between classroom activities (Olive, 2004; Buck, 1999). While children in general may not have the skills to switch from one activity to another, students with learning and attention-related challenges have a harder time with transitions due to poor attention, impulsivity, and hyperactivity (Buck, 1999, p.224). They may have difficulties finishing up a preferred activity, or refuse to start a non-preferred activity (Olive, 2004, p.11). In some instances, transitions provoke challenging behaviours such as aggression, self-injury, physical harm to others, and damage to physical surroundings (p.11). Structured transition times can decrease challenging behaviours and lead to improved academic performance (Buck, 1999, p.235). I saw an opportunity to use mindfulness as a way to utilize these transition times more effectively.

To adapt my own mindfulness watercolour painting exercise into an engaging activity that could fit within these transition times, I designed a felt puzzle set based on the formal elements of my own watercolour paintings. Generally, the term "puzzle" implies that the pieces only fit together to create a single image. I use the term only to suggest that the pieces are to be combined, without imposing a

single solution. As a mindfulness exercise, students could position the felt pieces on a board to create collage-like images that express their present emotions and experiences.

Because felt puzzles do not require extensive clean up, it can be implemented without significantly interfering with other scheduled classroom plans. In terms of material, felt is safer compared to other harder materials such as wood or metal, which can be dangerous if thrown and misused. By proposing a simpler mode of art-making, the felt puzzle could offer an opportunity for grade 1-3 students to practice mindfulness regularly during the school day.

Fig. 61: Initial prototype of felt puzzle board. Photo: Mariko Kuroda

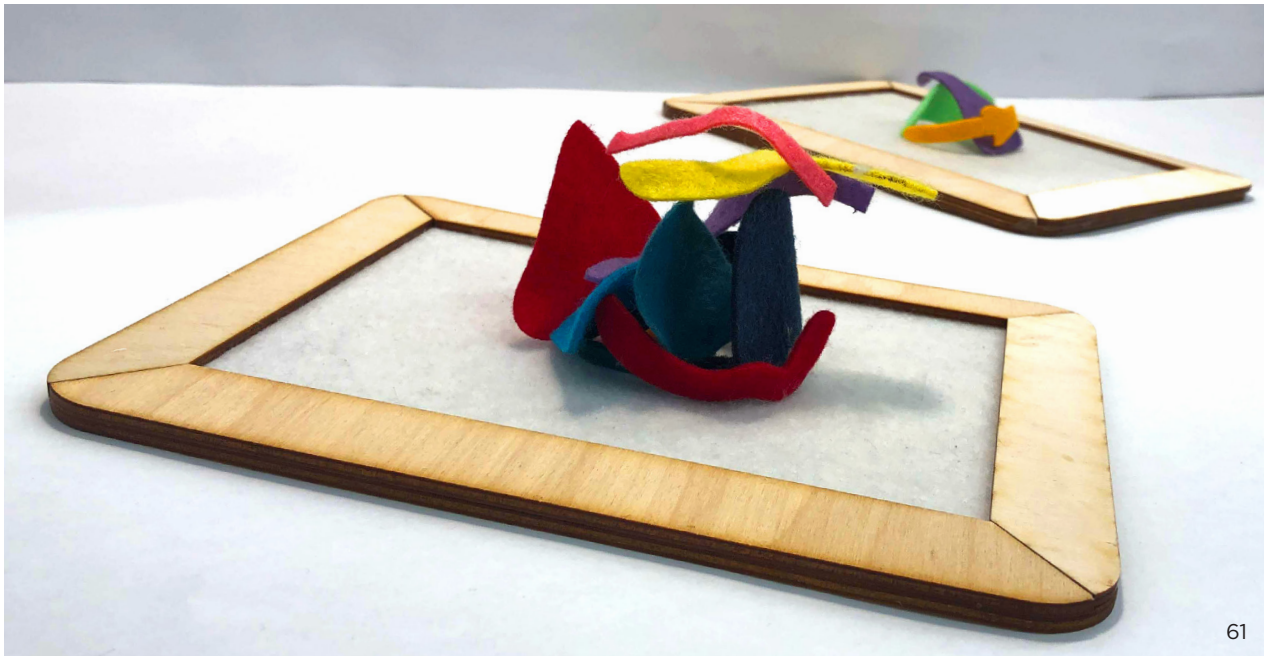
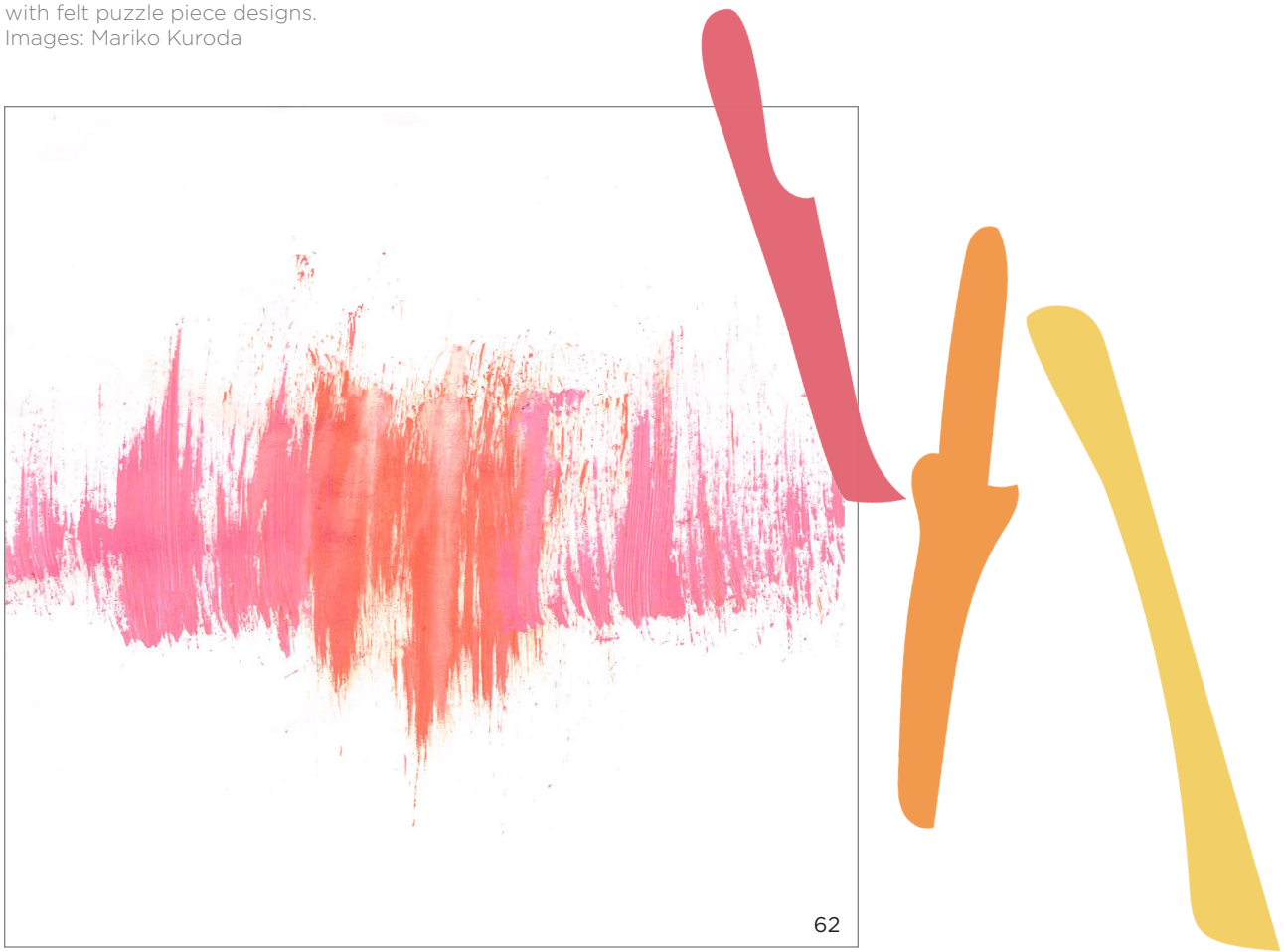
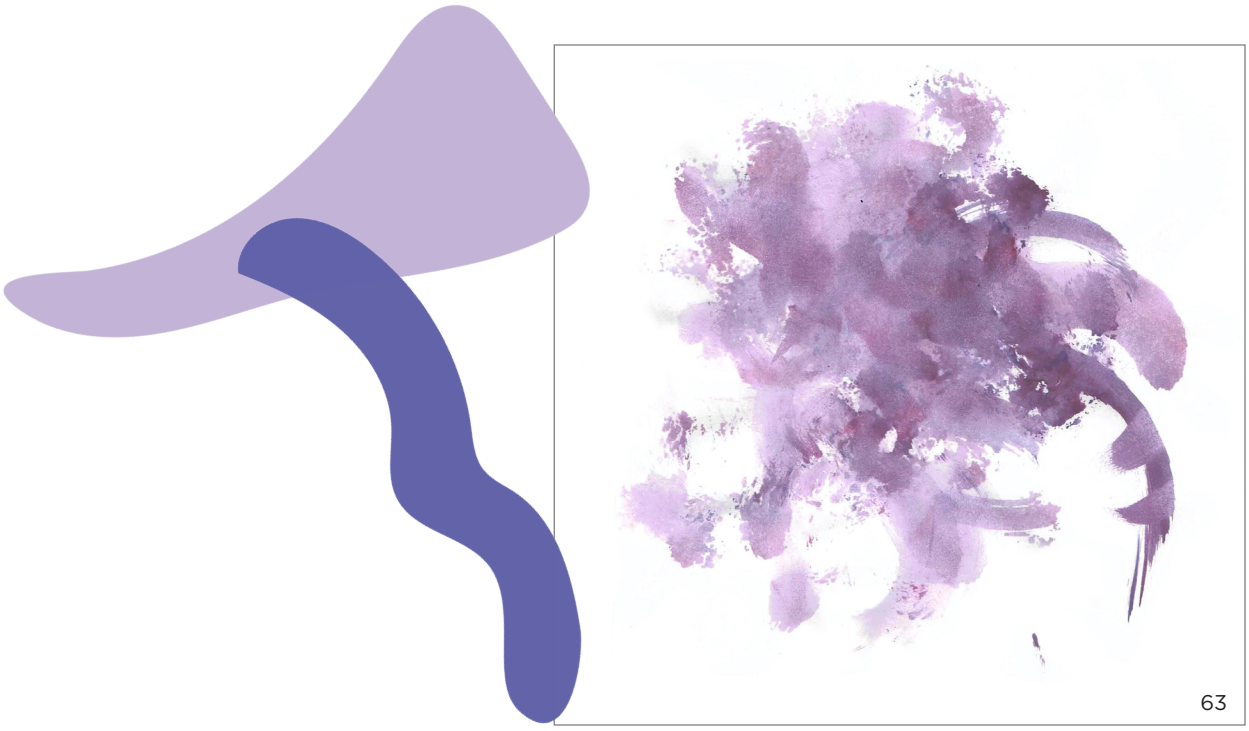


Fig. 62 to 65: Watercolor paintings with felt puzzle piece designs. Images: Mariko Kuroda





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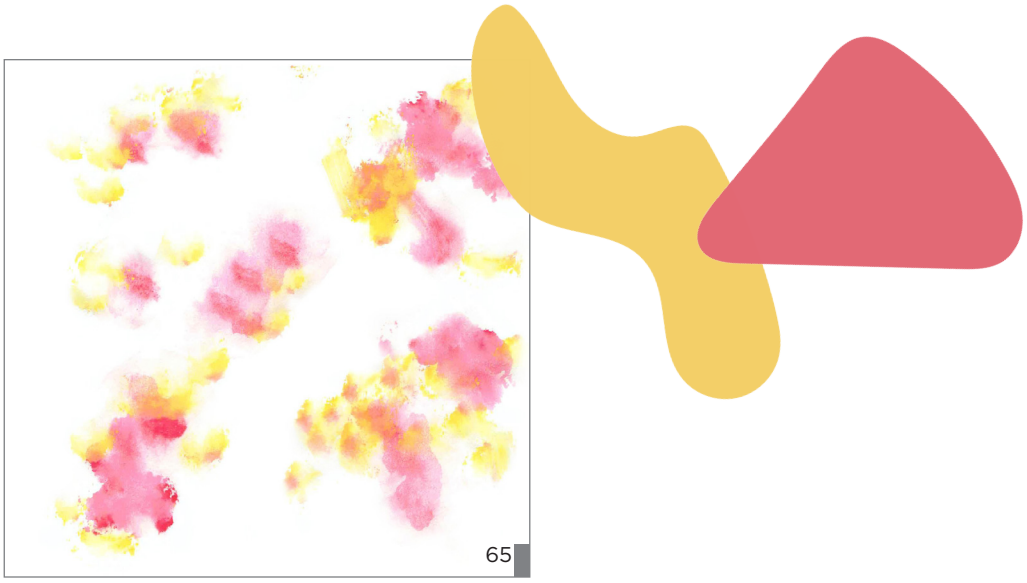

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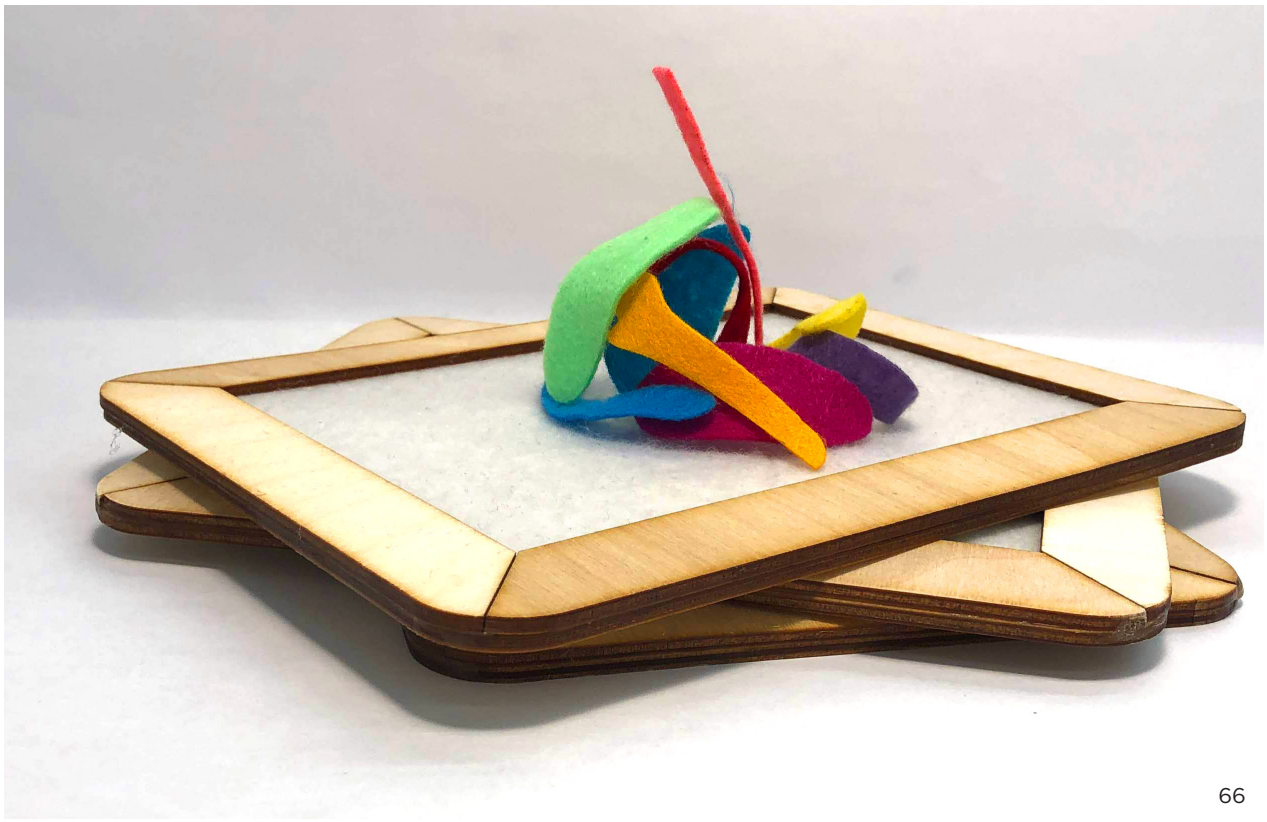

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Fig. 66: Stack of felt puzzle boards. Photo: Mariko Kuroda **Fig. 67:** Felt puzzle pieces. Photo: Mariko Kuroda **Fig. 68:** Close up of felt puzzle. Photo: Mariko Kuroda

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68

4. Test

User testing was conducted to understand the viability of the puzzle activity, appropriateness of the puzzle's design, and its influence on students' self-regulation skills.

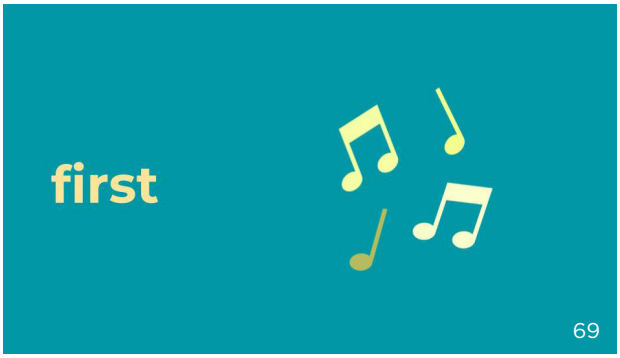
Before bringing the puzzle to the classrooms, I pitched the idea to three school counselors who are involved in building the SEL curriculum at KGMS. The counselors showed excitement towards the puzzle, and provided insights on how to implement the activity, such as using music to inspire emotions from students. Following this meeting I introduced the thesis project to the grades 1-3 teachers at KGMS on a professional development day in September 2018. During this time, teachers had the opportunity to use the felt puzzles. Many teachers received the project with enthusiasm, commenting on the tactility of the activity. Afterwards, they were recruited via a survey to test out the puzzle with their students. Teachers from grades 2 and 3 expressed interest in participating. The testing included a total of 26 students in grades 2 and 3 (13 students in each grade), and four teachers (2 teachers in each grade). Each student received a felt board and a set of 21 felt puzzle pieces.

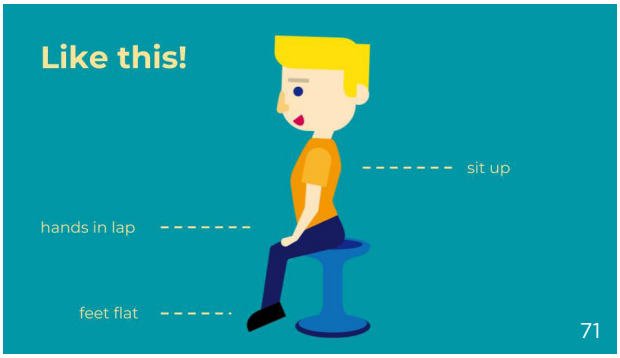
The user testing was divided into two one-week conditions: a music condition, and a body scanning condition. In the first week, students created artwork with the puzzles as a response to a piece of music. I provided teachers with a total of five royalty-free instrumental pieces of different moods (uplifting, happy, calm, mysterious, scary)—one for each day of the week. Songs were between 1 to 2 minutes long. Students listened to the song, and were prompted with questions such as "How does this music make you feel? What does it remind you of?" They then used the puzzle to respond to the song. This first week was intended to ease students into the practice of paying attention to their feelings. Rather than asking students to identify existing feelings within themselves, I first challenged them with the task of identifying feelings evoked by a song.

In the second week, students performed body scanning, and used the puzzle to represent their

bodily sensations. Each day, students exercised body scanning on different parts of the body (head and face, shoulders, arms, stomach, and legs).

On the first days of both conditions, I visited the classes to introduce and facilitate the puzzle activity as an example to the teachers. On subsequent days, the teachers led the activity with their students. I provided teachers with a slideshow containing instructions and visuals for the activities (Figures 69-77). Teachers photographed students' puzzles everyday as a record of the activity.





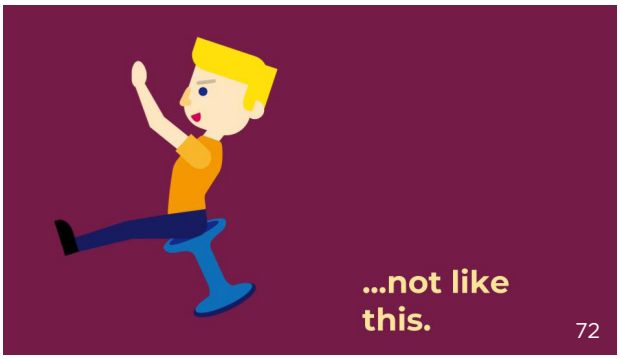


Fig. 69 to 72: Slides from the slideshow given to grades 2 and 3 teachers to guide the felt puzzle activity. Images: Mariko Kuroda

MONDAY:

head & face

Move your head from side to side.
Does it feel heavy or light?
Does it feel noisy or quiet inside?

Now focus on your face.
Is it hot or cold?
Does it feel tight or loose?

73

TUESDAY:

shoulders

Put your hands on your shoulders
and raise them up and down.
Does it feel heavy or light?
Is it hot or cold?
Is it tight or loose?

74

WEDNESDAY:
arms

Raise your arms slowly, and then lower them.
Do they feel heavy or light?
Are they hot or cold?
Are they tight or loose?

75

THURSDAY:
stomach

Put your hand on your stomach.
Feel it move as you breathe in and out.
Does it feel tight or loose?
Does it feel hot or cold?
Is it full or empty?
Is there any pain?

76

FRIDAY:
legs

Raise your legs slowly and lower them.
Do they feel heavy or light?
Do they feel tight or loose?
Do they feel hot or cold?
Is there any pain?

77

Fig. 73 to 77: Slides from the slideshow given to grades 2 and 3 teachers to guide the felt puzzle activity. Images: Mariko Kuroda

5. Reiterate

Results from the initial user testing were analyzed to revise the design of the prototype for a second round of user testing.

COLLAGE WORKSHOP

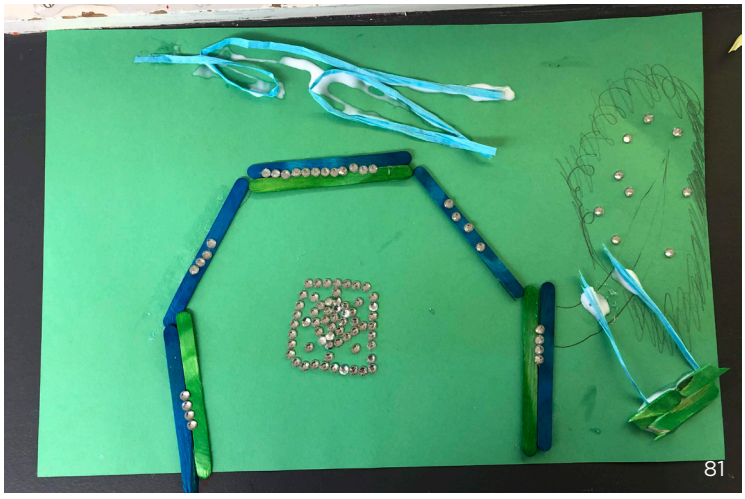
Following the initial user testing, I led a collage-making workshop with grade 2, where students responded to a piece of music using various art materials such as construction paper, sequins, feathers, and wood. The purpose of the workshop was to understand how students express emotions when provided with a larger selection of craft supplies.


78


79

Fig. 78 to 83: Collages by students in grade 2 from the co-creation activity. Photos: Mariko Kuroda

80



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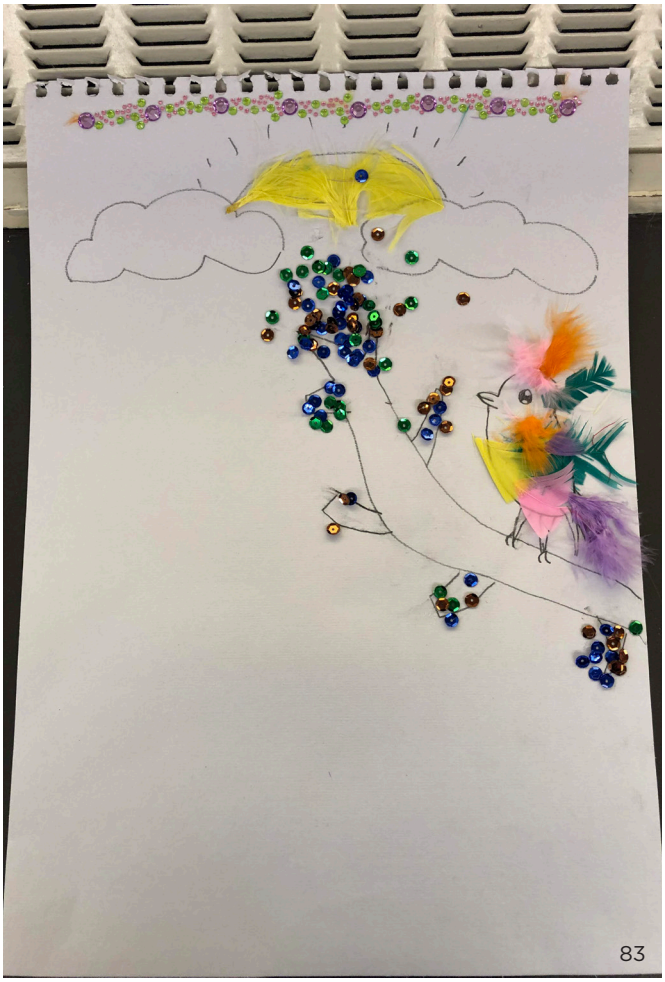

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DATA COLLECTION & ANALYSIS

Analysis of the puzzles and collages from both grades showed that students relied on pictorial representations when describing their feelings. Faces, plants, and animals were some of the most recurrent designs. In the collages, many students depicted straight lines and regular shapes such as squares, rectangles, triangles, and ellipses. In both the felt puzzles and the collages, several students built three dimensionally, demonstrating divergent thinking. Many puzzles appeared "crowded", with students attempting to fit as many pieces as they could within the frame. In the two weeks, students had also lost several puzzle pieces.

EXIT SURVEY

Following the user testing, I conducted exit survey interviews with the grade 2 and 3 teachers to receive feedback on the mindfulness puzzle activity. Teachers were encouraged to provide both positive and negative comments, as both would be integral to improving the puzzle. In both grades, teachers observed differences in class dynamics when the puzzle was used with the music compared to the body scanning. When the puzzle was used to respond to music, the activity was largely self-directed as students didn't require further instructions. Once the music started, the students "concentrated on creating", as one of the teachers described. In contrast, when the puzzle was used with body scanning, teachers had to guide the body scan by referring to the prompts provided on the slideshow. They found that connecting the body scan to the puzzle was difficult for the students.

Grade 2 teachers noticed that the puzzles helped students transition from a high level of alertness to a state where they were ready to learn. The grade 3 teachers observed that the puzzle was not effective in helping students shift from recess to class, as their energy levels would be too high. However, they saw that it worked better in the morning as a way for students to begin the school day. Grade 2 teachers wished that the musical pieces would be longer, as they often had to replay the music several times while the students completed their puzzles. Grade 3 teachers commented that they would like to see more variety in shapes, as their students eventually got bored with the given set and were not actively participating in the activity.

Fig. 84 to 87: Felt puzzles by students in grade 2 from the initial user testing. Photos: Mariko Kuroda
Fig. 88: Felt puzzles by students in grade 2 from the initial user testing.

SECOND USER TESTING

Following the initial user testing, I revised the design of both the felt board and puzzle pieces. To prevent students from losing the puzzle pieces, I integrated a felt board onto a lid of a box where students could store unused pieces. The dimensions of the board were expanded, and the frame removed to offer students more space. Since the white felt boards got dirty, I changed its color to black, which also made the color of puzzle pieces appear brighter. In contrast to the abstract shapes of the initial puzzle pieces, the new puzzle set included regular shapes such as squares, rectangles, and triangles to make it easier for students to envision feelings through concrete representations. Some pieces featured slits that made it easier for them to stretch, fold, stand upright, or be combined with other pieces.

In terms of the mindfulness activity, I removed the body scan condition which was not working well with either classes, and framed the activity as a musical response activity. The slideshow was amended with visuals to reflect these changes.

The revised puzzle was user tested by the grades 2 class for one week. Rather than providing five individual musical pieces for each day, I selected five playlists of different moods (happy, mysterious, relaxing, uplifting, peaceful) that ranged from 20 minutes to three hours long. Unlike the initial user testing, the activity was led by the teachers for the entire duration of the testing. Puzzles were photographed daily after each session.

Fig. 89: Felt pieces from second prototype of felt puzzle board. Photo: Mariko Kuroda

89

Fig. 90 to 92: Second prototype of felt puzzle board. Photo: Mariko Kuroda

DATA COLLECTION & ANALYSIS

Compared to the puzzles from the first user testing, few students created pictorial representations. While it was expected that the more regular-shaped would encourage students to make recognizable objects, the added slits led them to build more three dimensional forms. Students experimented with layering, folding, stretching, and standing pieces, as well as inserting pieces through other pieces.

EXIT SURVEY

Grade 2 teachers observed that the students were more engaged while using the revised puzzles, as the slits in the puzzle pieces multiplied the number of ways the pieces could be combined, and inspired them to build more three dimensionally. Students did not lose any pieces as they were able to store extra pieces inside the box. The teachers favoured using playlists over playing individual songs as it allowed them to be more flexible with the length of the activity. For the students, the longer duration of the playlists allowed them to take their time and listen to the music, rather than feeling pressured to finish the puzzle with the end of the song.

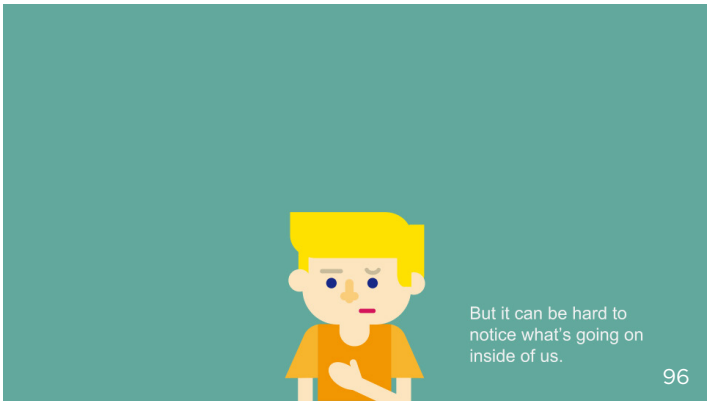
93

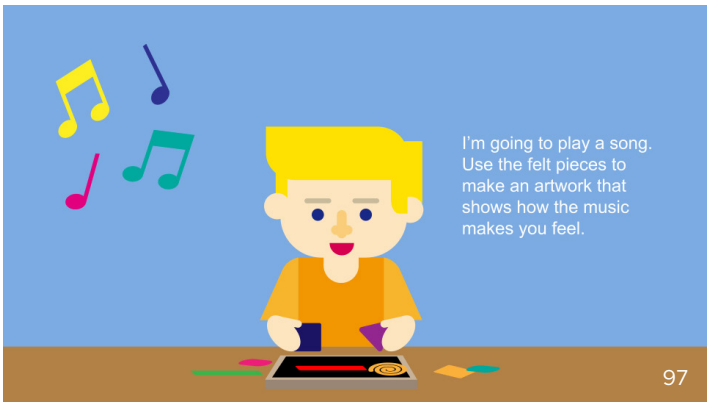
Fig. 93 to 95: Felt puzzles by students in grade 2 from the second user testing. Photo: Mariko Kuroda

The final design outcome of the thesis project included two elements:

1. Felt puzzle board

2. Slideshow





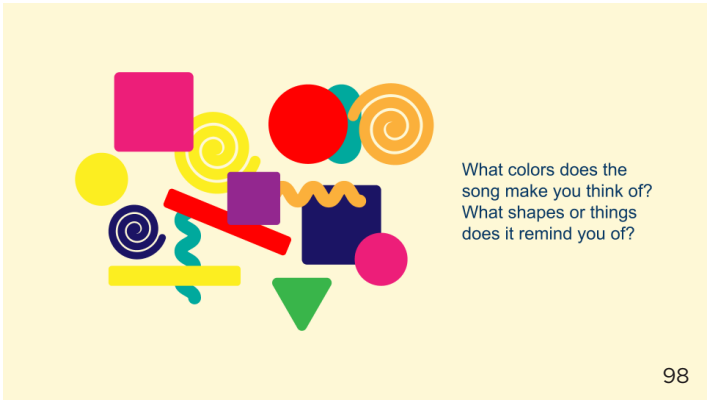


Fig. 96 to 98: Slides to explain how to use the felt puzzle. Images: Mariko Kuroda

FELT PUZZLE BOARD

The final version of the mindfulness puzzle included 24 felt pieces. Several pieces featured multiple slits that could be used to combine shapes three dimensionally. The felt board was integrated into a lid of a wooden box that also served as a container for the pieces. Both the felt pieces and the box were built using laser cutting technology.

SLIDESHOW

Teachers received a Powerpoint slideshow to use to explain to their students the concept of mindfulness and how to use the felt puzzle. The slideshow also contained links to music playlists that teachers could play while conducting the felt puzzle activity.

Fig. 99 & 100: Final designs of the felt puzzle board. Photo: Mariko Kuroda
Fig. 101: Felt pieces from final design of felt puzzle board. Photo: Mariko Kuroda

This research studied the use of art-making as a mode of mindfulness practice for students with learning differences in grades 1-3.

This research studied the use of art-making as a mode of mindfulness practice for students with learning differences in grades 1-3. The first two objectives of this research were to introduce mindfulness as a transitional activity in the KGMS grades 1-3 classes in a way that fit the school's unique academic culture, and to equip teachers who were not certified mindfulness instructors with the resources to teach art-making as a form of mindfulness practice.

Using data collected from ethnographic, autoethnographic, and participatory research methods, I designed a resource to implement mindfulness as a transitional activity in the grades 1-3 classrooms (Figures 102 & 103). The resource included a mindfulness felt puzzle, and a slideshow of visuals explaining how to use the felt puzzle. Two rounds of user testing involving the grades 2 and 3 classes demonstrated that the activity helped promote self-regulation among students during classroom transition times, and that teachers felt most confident in guiding the felt puzzle activity when it was used as an exercise to visually express music.

The outcomes of this thesis have contributed knowledge both to teachers at KGMS and designers working in school settings. For the teachers, this project has offered mindfulness as another tool for them to use with their students in teaching self-regulation. Through my felt puzzle activity, teachers without formal training in mindfulness are able to teach mindfulness as a self-regulation technique that students can carry on into mainstream schools and throughout their lives. The teachers' participation in the research, namely through the user testing and reiteration phases, has also given them an understanding of design process and its impact in educational settings. Through the collage workshop and multiple user testings, teachers witnessed the cyclical nature of design that accepts failure as inspiration for better outcomes. I hope that by taking part in this research, teachers will be encouraged to offer their own solutions to other problems in the classroom without fearing failure.

Fig. 102: Close up of felt puzzle.
Photo: Mariko Kuroda

For designers, I hope my thesis offers them the courage to think divergently about ways of learning, and spend more time in the exploratory phase of design. While many teaching resources take the form of books, worksheets, or online resources, the unique educational environment at KGMS as well as the exploratory phase of my research pushed me to consider other modes of teaching mindfulness, such as through tactile tools. A majority of the mindfulness tools that I prototyped during the exploratory phase, like the Flamingo Stand and the Butterfly Balance, were determined as non-viable in the classroom through my primary research at KGMS. However, my own self-reflective studies with watercolor painting revealed a new approach to use art-making as a mindfulness practice. This realization would not have been possible had I not been actively generating prototypes and looking at alternative ways of practicing mindfulness. The exploratory phase is an opportunity to draw paths from a problem to a solution. More paths create more intersections that connect to new solutions. I hope that my thesis encourages other designers to hold faith in their explorations.

The last objective of this research was to identify what mindfulness means in the context of KGMS. Findings from two rounds of user testing raised speculations on the role of intuition and creativity in practicing mindfulness with children who have learning differences. In the music condition, students used the puzzle with ease. Teachers described the students as "calm" and "concentrating on creating." In the body scan condition, however, students required more prompting and guidance to visually represent physical sensations. The connection between the body scan and the puzzle was not clear.

These observations suggest that using the puzzle with a body scanning exercise may have placed a cognitive load that disrupted the students' present-awareness. The dual difficulty of recognizing bodily

"I therefore propose the following definition of mindfulness for KGMS: a consistent, creative, and intuitive process that sharpens present awareness and generates artistic output."

sensations and visually expressing them hindered their mindfulness experience. When listening to a piece of music, however, the puzzle aided present-awareness. The process of capturing emotions in a song and translating them into artwork was intuitive. This creative output is even comparable to a form of non-judgmentalness or "release": students welcomed the feelings in a song to enter their minds and let them flow out as a piece of art.

The lack of an operational definition of mindfulness gives me the freedom to define mindfulness in the unique academic setting of KGMS. I therefore propose the following definition of mindfulness for KGMS: a consistent, creative, and intuitive process that sharpens present awareness and generates artistic output. This definition weaves together the core aspects of mindfulness as they have traveled through contexts of religion and science, while highlighting the findings of my own research. While this working definition of mindfulness was constructed through a case study with KGMS, it could offer suggestions on ways to practice mindfulness outside the context of education and learning differences.

Classroom observations and conversations with teachers from grade 1 revealed that the design of the mindfulness puzzle did not suit the cognitive capacities of students in this age group.

Common difficulties of grade 1 students include identifying, understanding, expressing, and interpreting emotions—all of which are important in identifying the feelings in a piece of music. As grade 1 teachers expressed concern that the felt puzzle activity would be too complicated for their students, they were not included in the user testing. However, the original intent of the project was to implement mindfulness as transitional activity in the grades 1-3 classrooms. There remains a need to make mindfulness accessible to the grade 1 students and teachers.

One solution could be to adapt the mindfulness puzzle into a tactile activity that trains sensory awareness. Further research could look into the design of a mindfulness puzzle activity that exercises present-awareness and artistic expression through the sense of touch. Puzzle pieces could perhaps incorporate materials other than felt to present varied sensory stimuli.

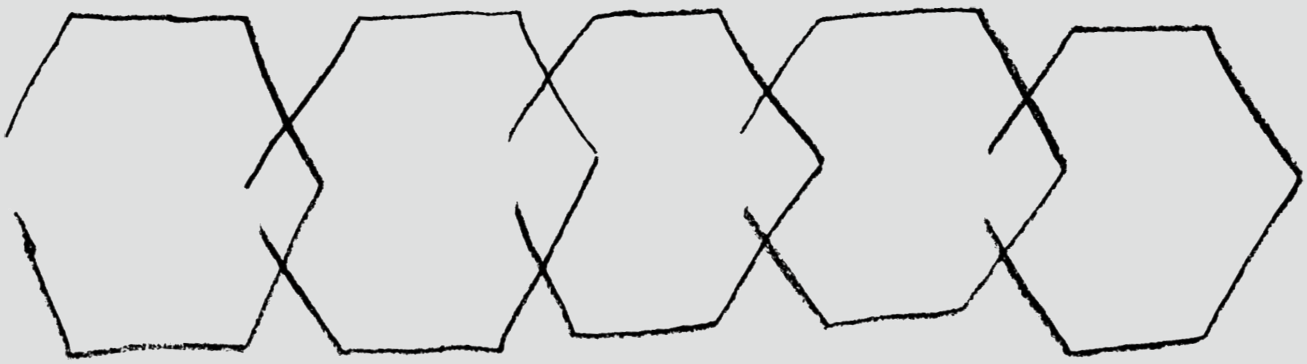
On the other end of the age spectrum, research could also be done on how to modify the activity to fit the abilities of older students above grade 3. Of special interest would be to evaluate the success of combining the felt puzzle activity with the body scanning exercise, which did not work in grades 2 and 3. Results from this research could suggest a modification on the definition of mindfulness that I proposed in the previous section.

Another direction for future research would be to integrate mindfulness into mainstream school curriculums. This thesis project was a case study at KGMS, where social-emotional learning is taught regularly and self-regulation is a familiar practice. Research could be done on how to introduce concepts of self-regulation and mindfulness to mainstream school teachers, and assess the viability of the felt puzzle activity in other academic environments.

As mentioned previously, one goal of KGMS students is to re-integrate into the mainstream school system. A follow-up research project would be to study whether students who participated in the felt puzzle activity are able to carry on their mindfulness practices in a mainstream school environment. It would be interesting to see if students choose to practice mindfulness through other creative means, such as doodling or origami, that are more discrete and accessible in a mainstream school setting. Such research could further support the definition of mindfulness as an activity that generates "release", or creative output.

Fig. 103: Felt puzzles by grade 2 students from second user testing. Photo: Mariko Kuroda

We're now at the end of the thesis. Let's close with one more breathing exercise. Breathe in, and feel your lungs fill up. Breathe out, and feel the air escape.



Be in the moment. Not in
the past. Not in the future.
Let go of regrets. Let go of plans.
Be with yourself right now.

- END -

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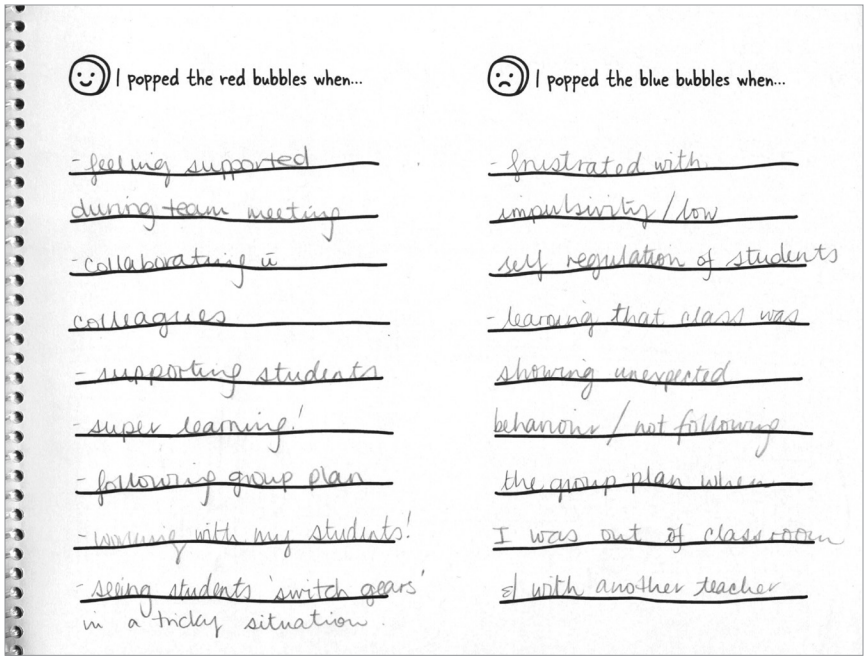
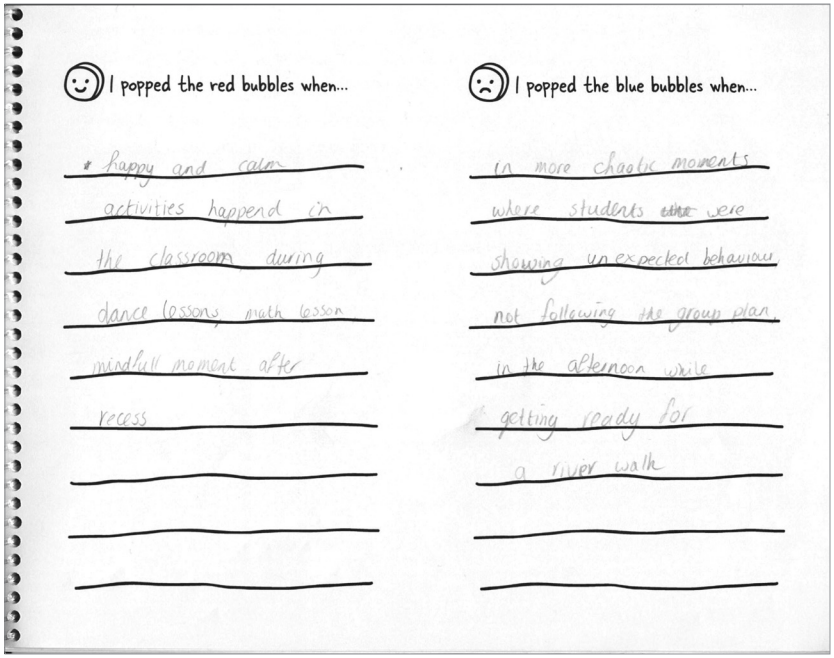
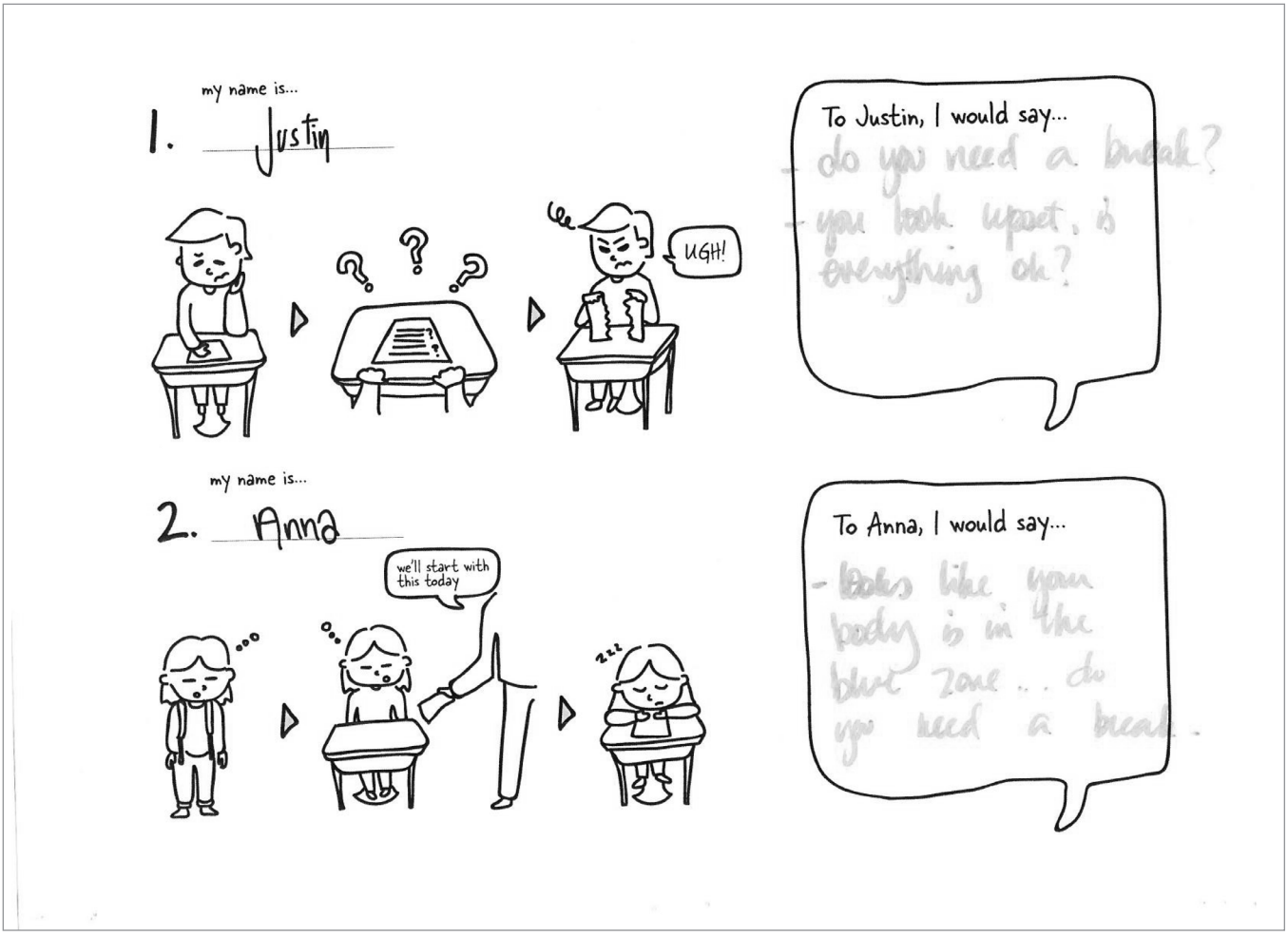
Appendix 1

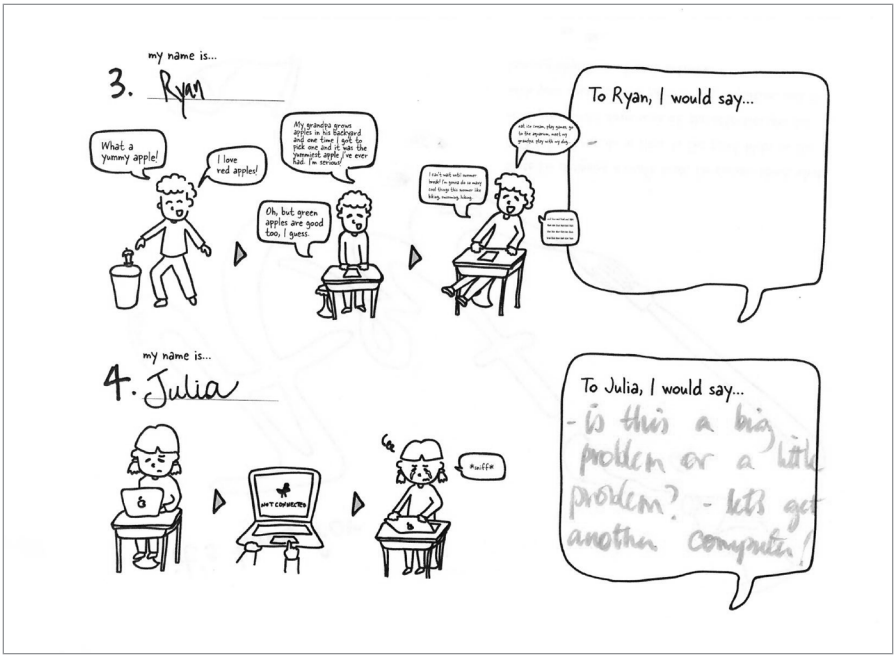
Responses to Cultural Probes



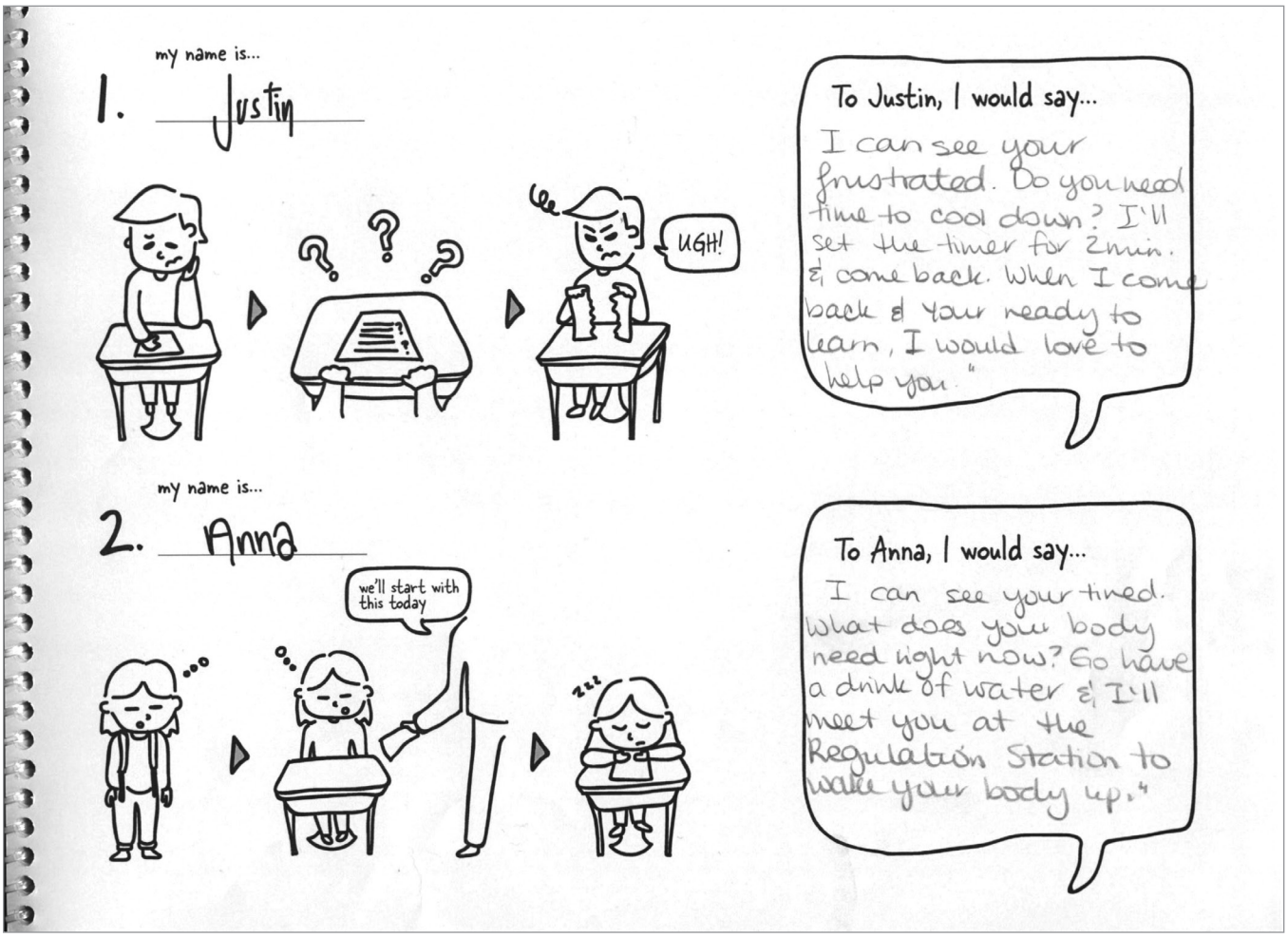
Responses to the Mindful Bracelet activity from Division 2 teachers. Division 1 and 3 teachers did not respond to this activity.







Response to the "What Do You Say" activity from Division 1 teacher



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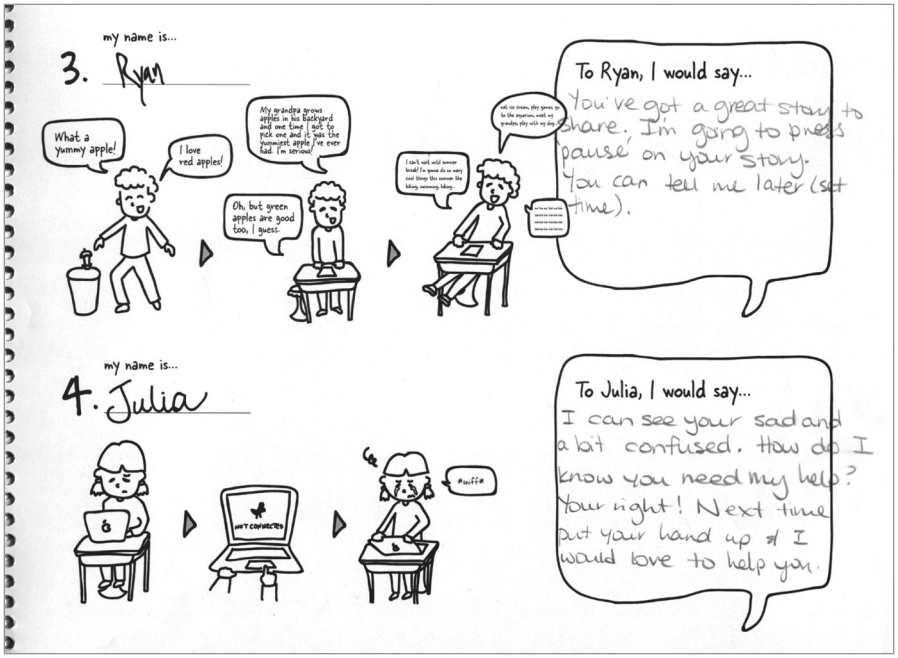
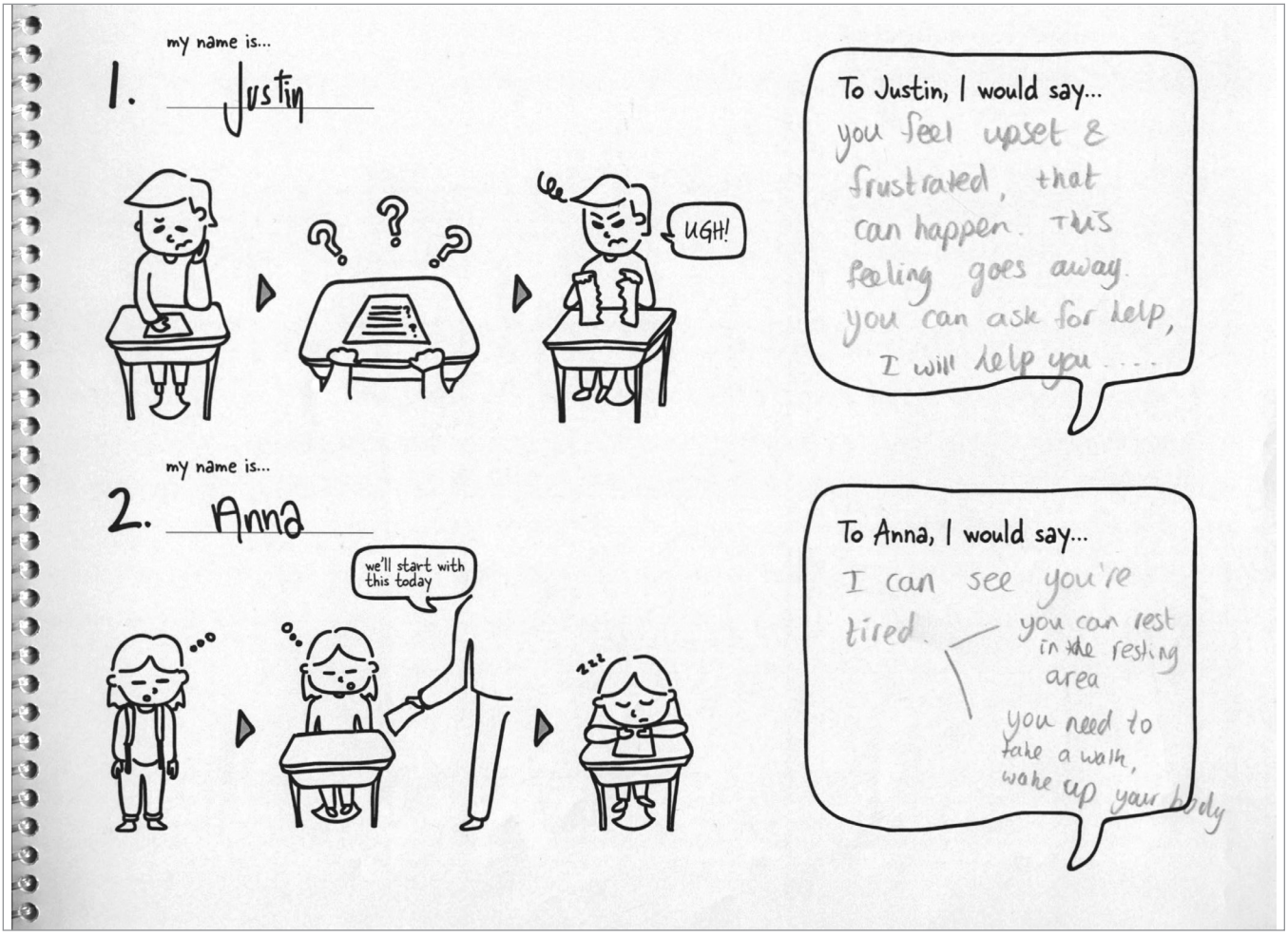
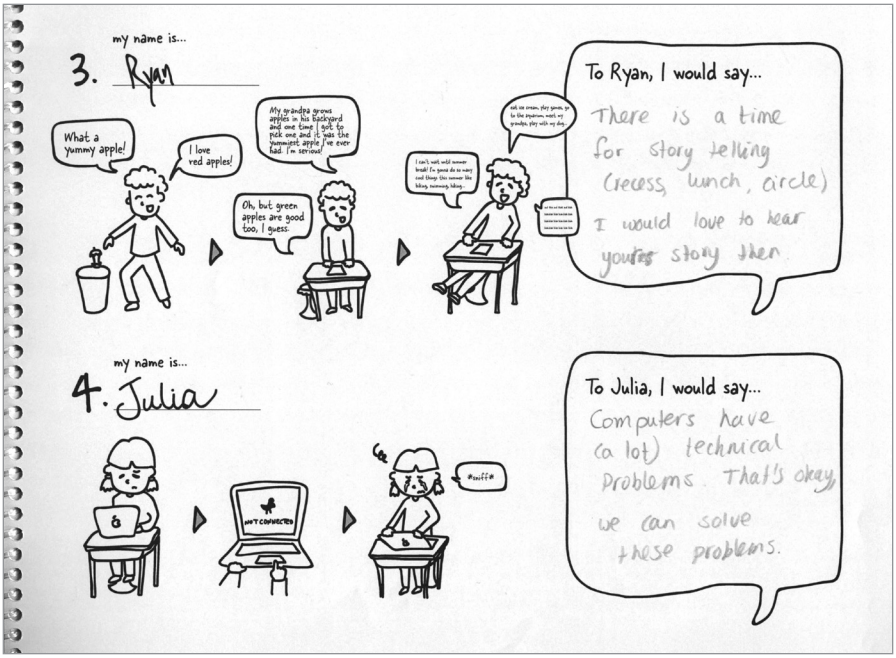
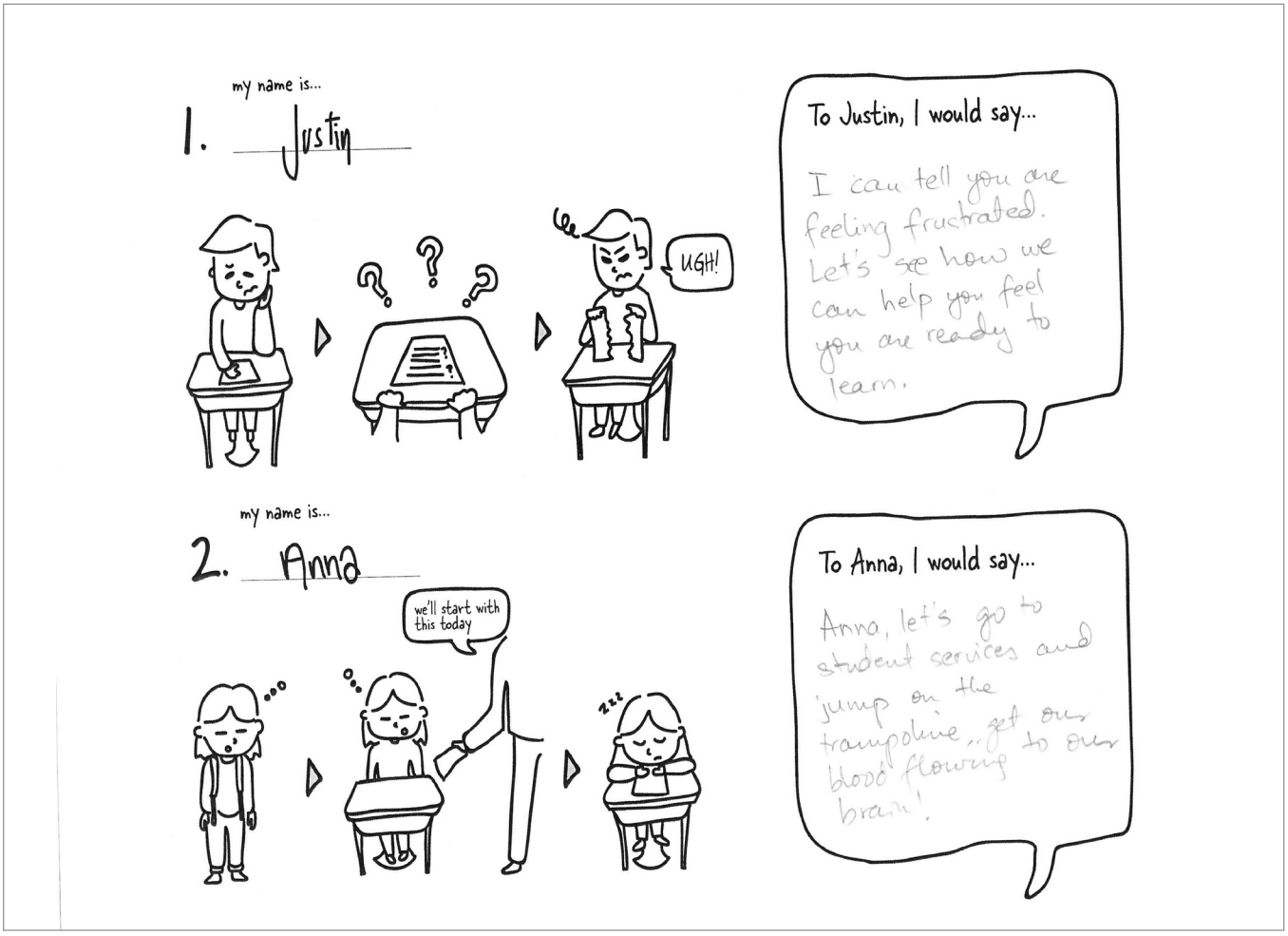


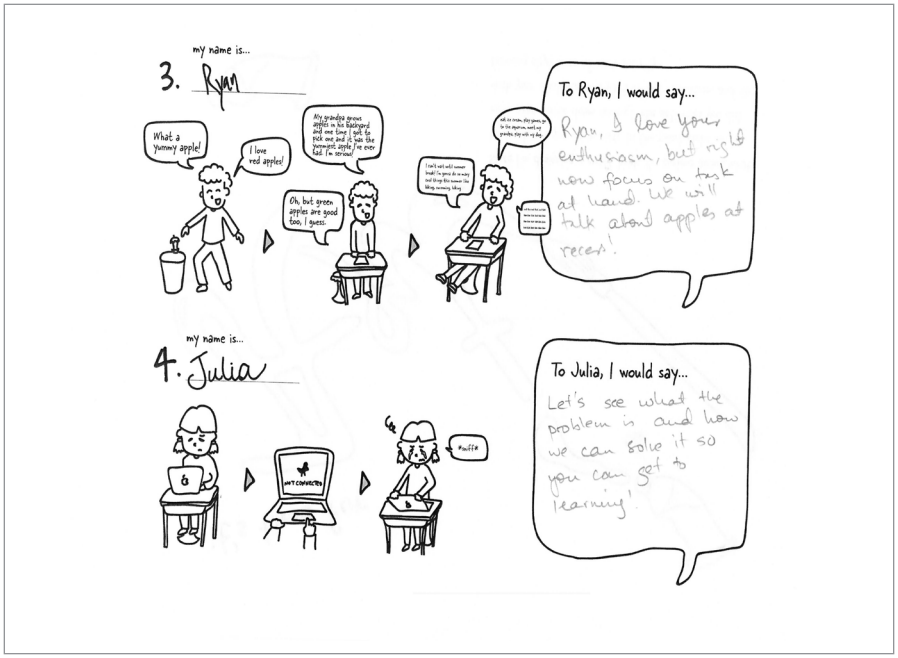


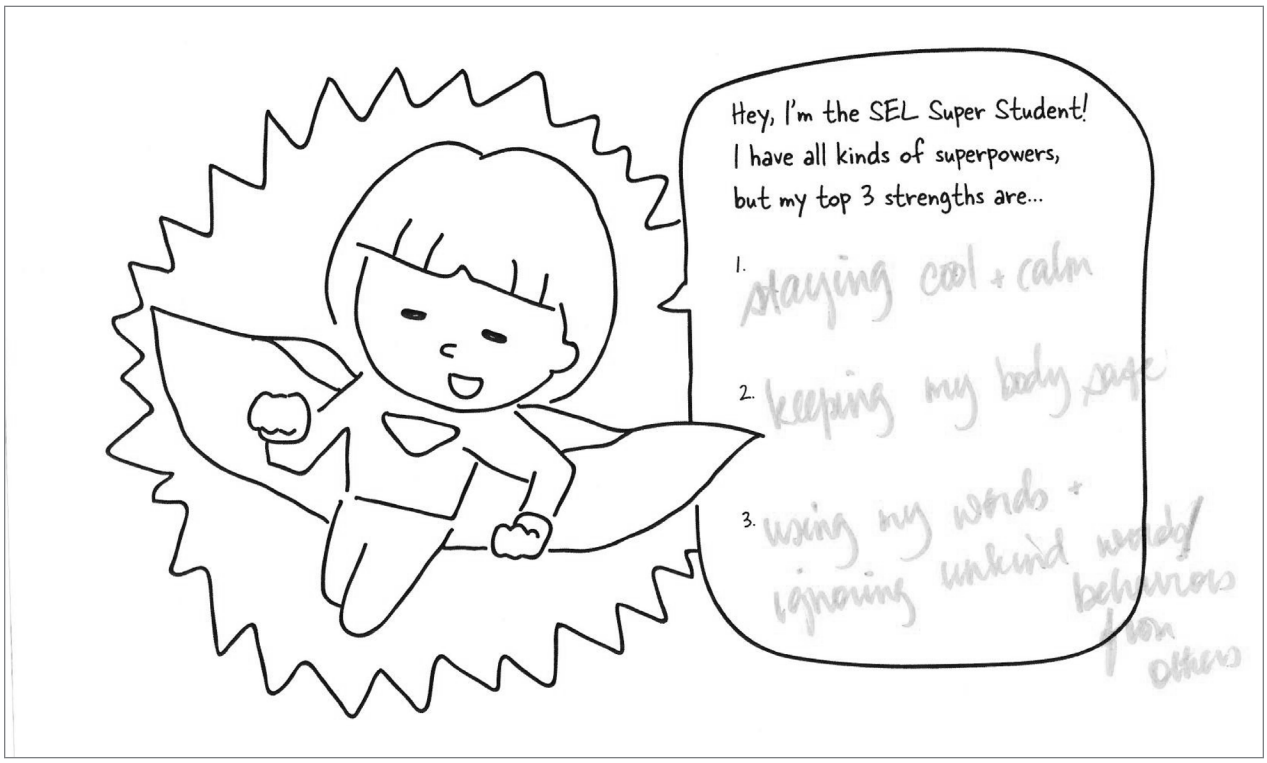


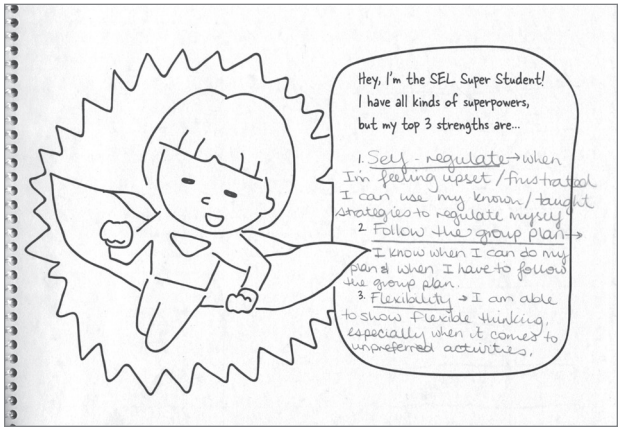
Response to the "What Do You Say" activity from Division 2 teacher

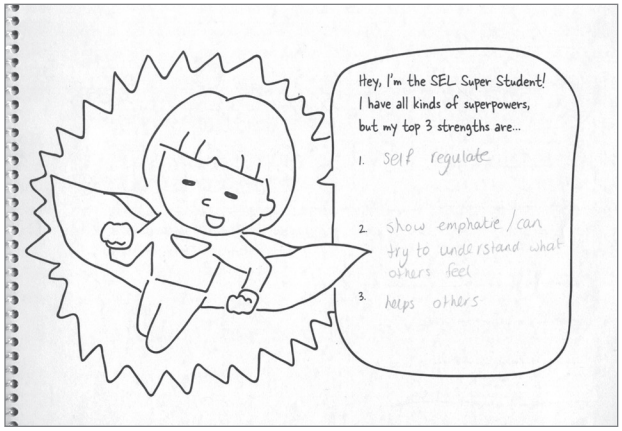


Response to the "What Do You Say" activity from Division 3 teacher

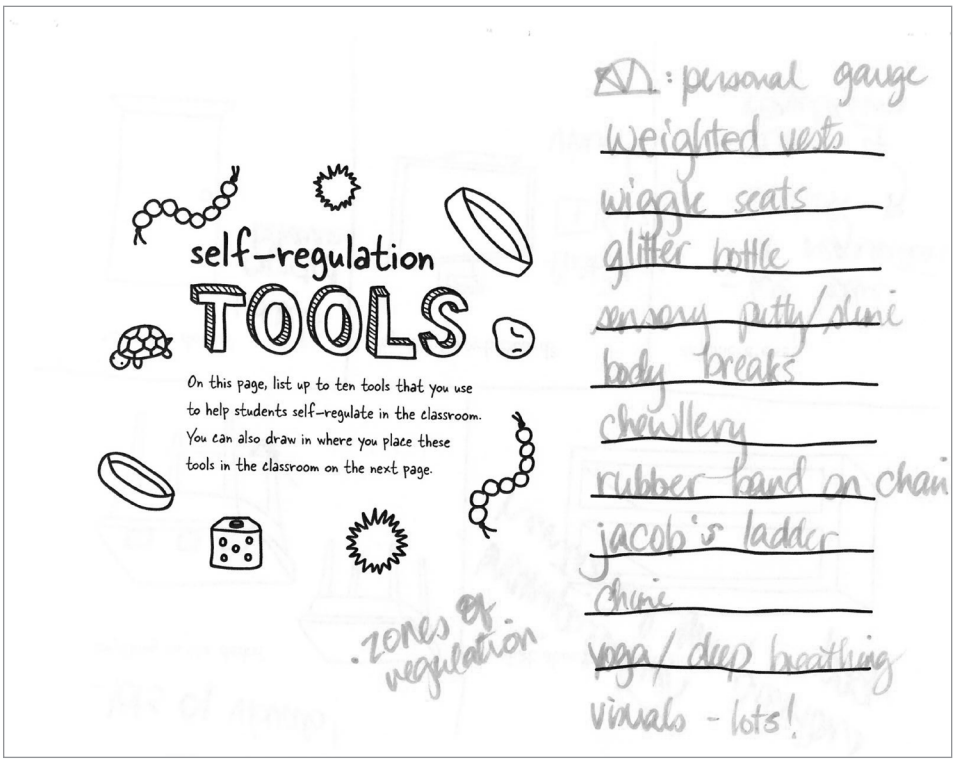




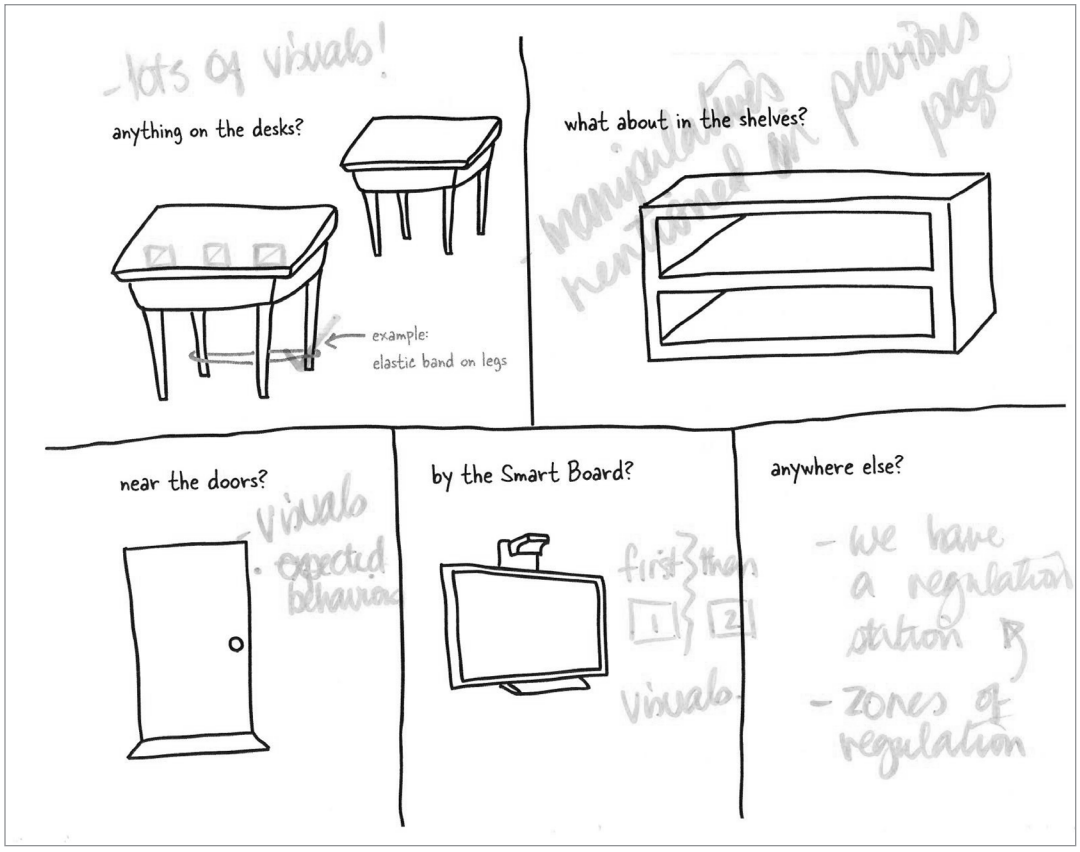


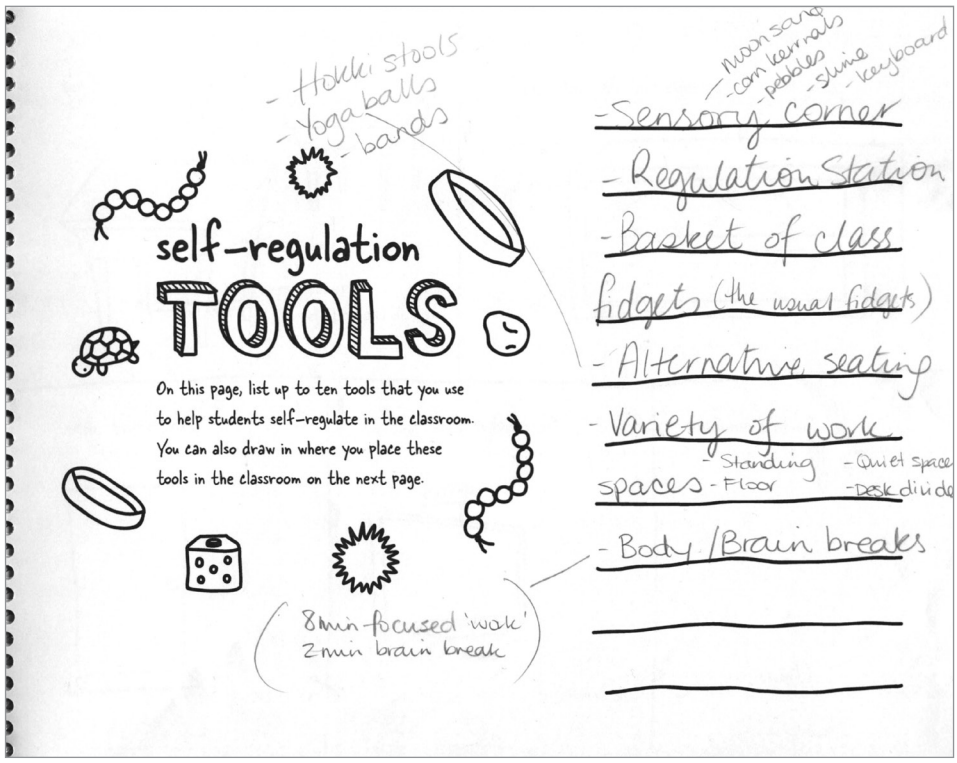


Response to the "SEL Super Student" activity from Division 1-3 teachers

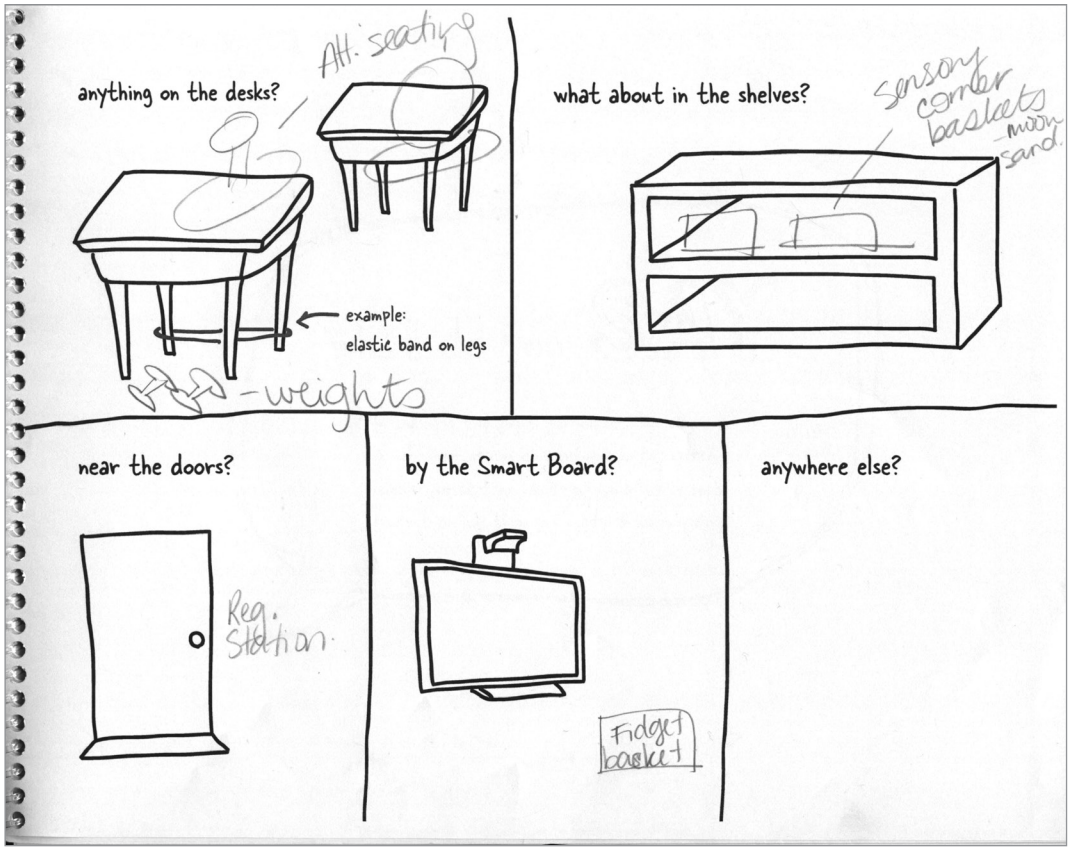


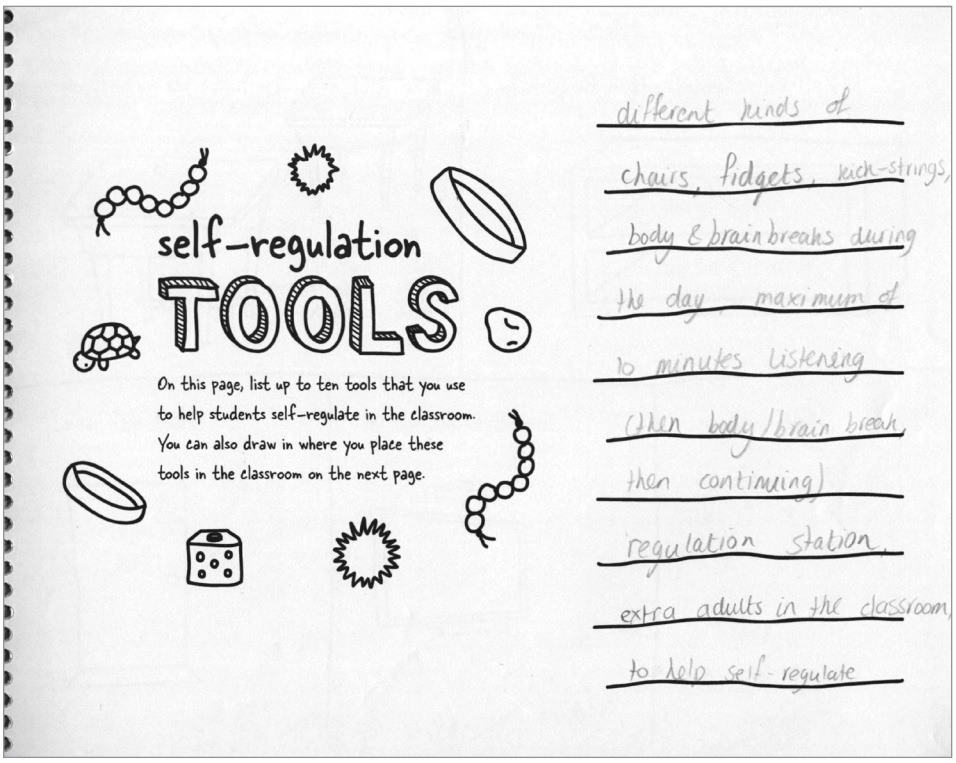
Response to the "Self-Regulation Tools" activity from Division 1 teacher



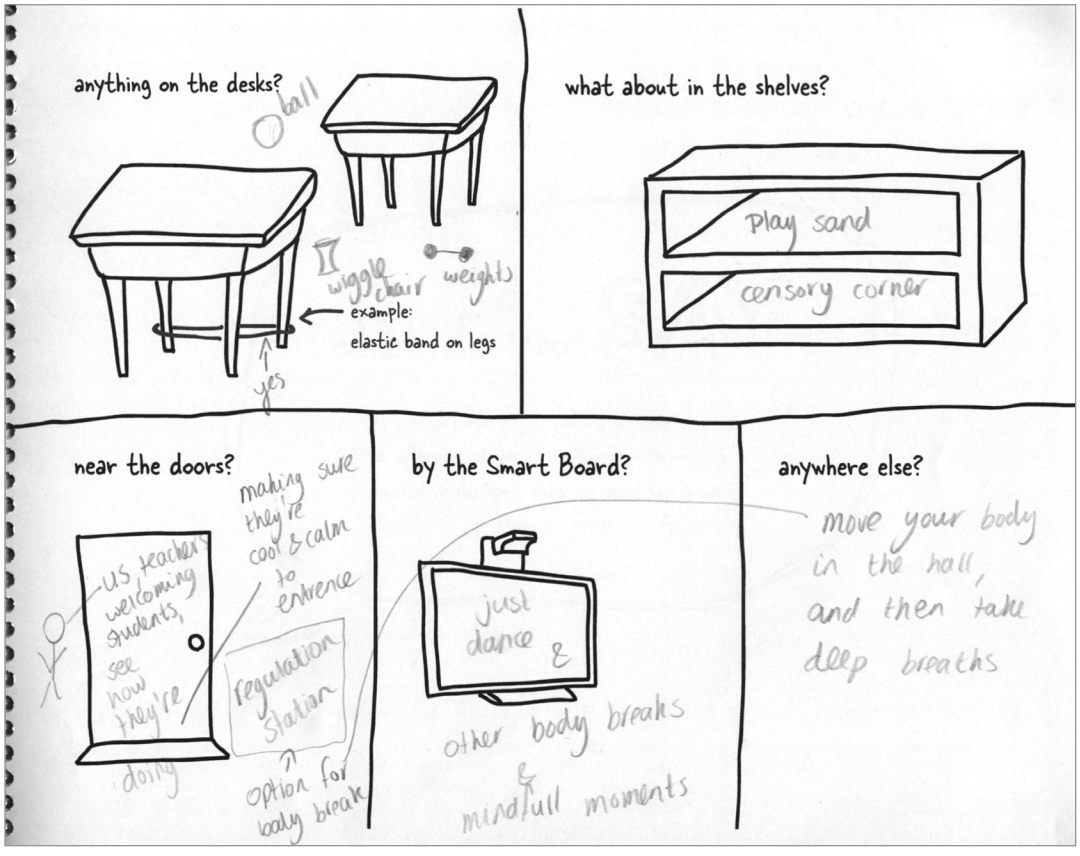


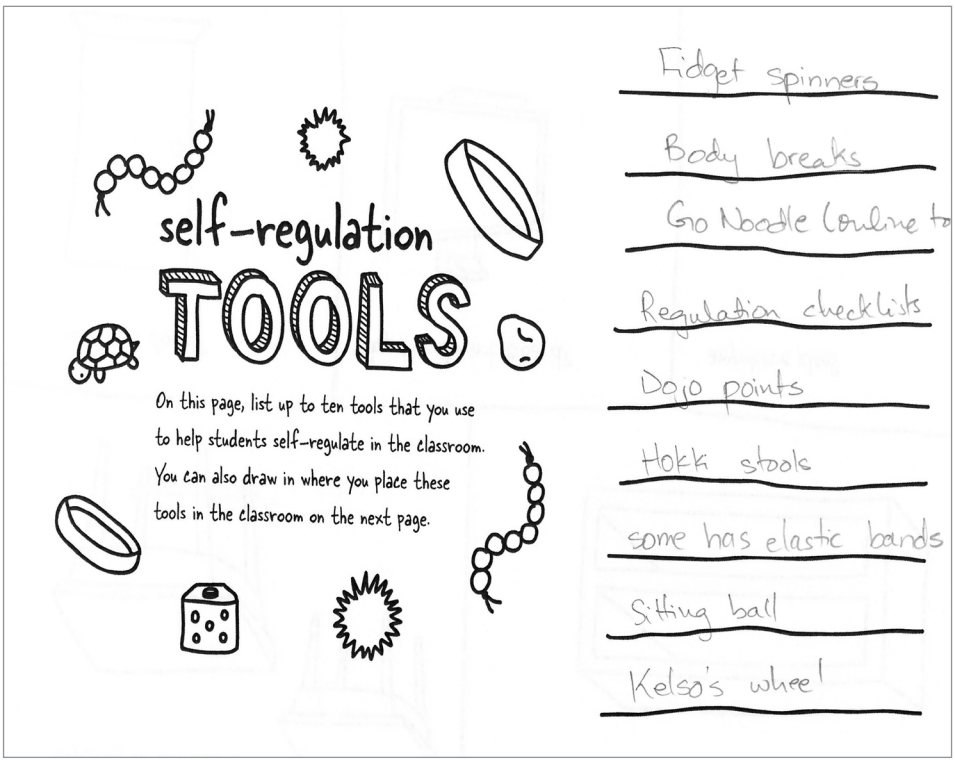
Response to the "Self-Regulation Tools" activity from Division 2 teacher



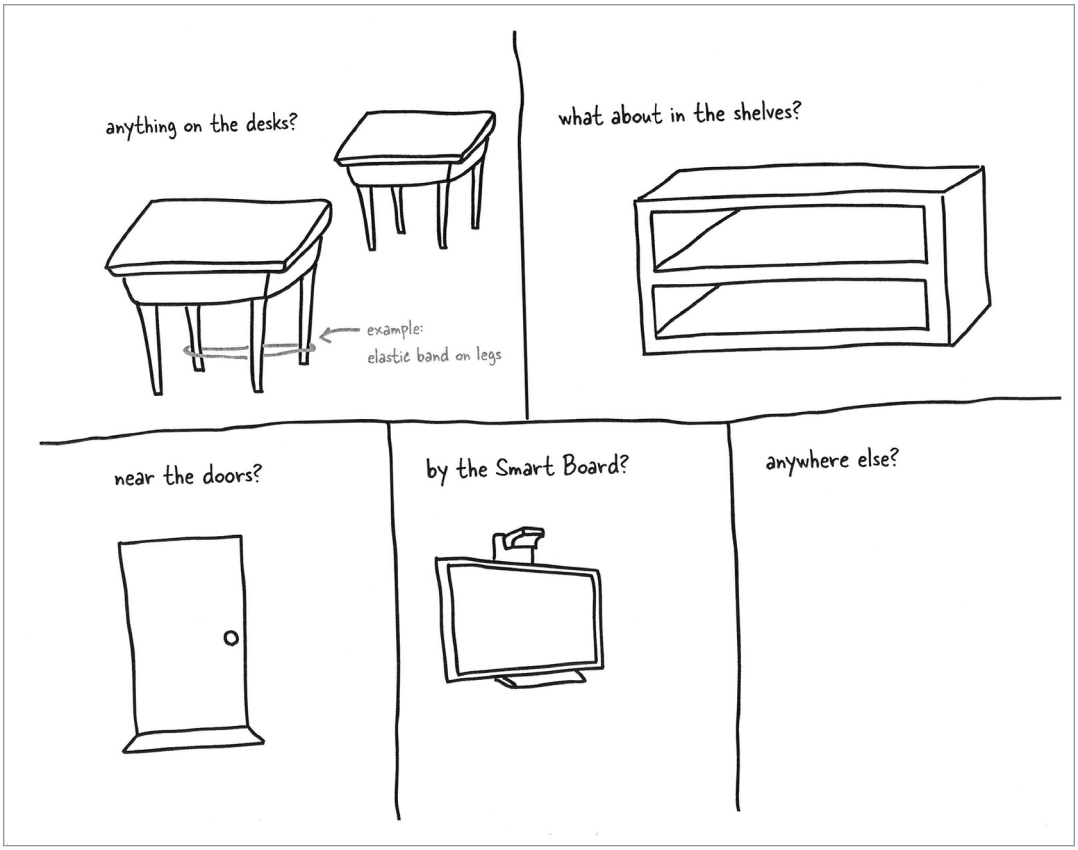


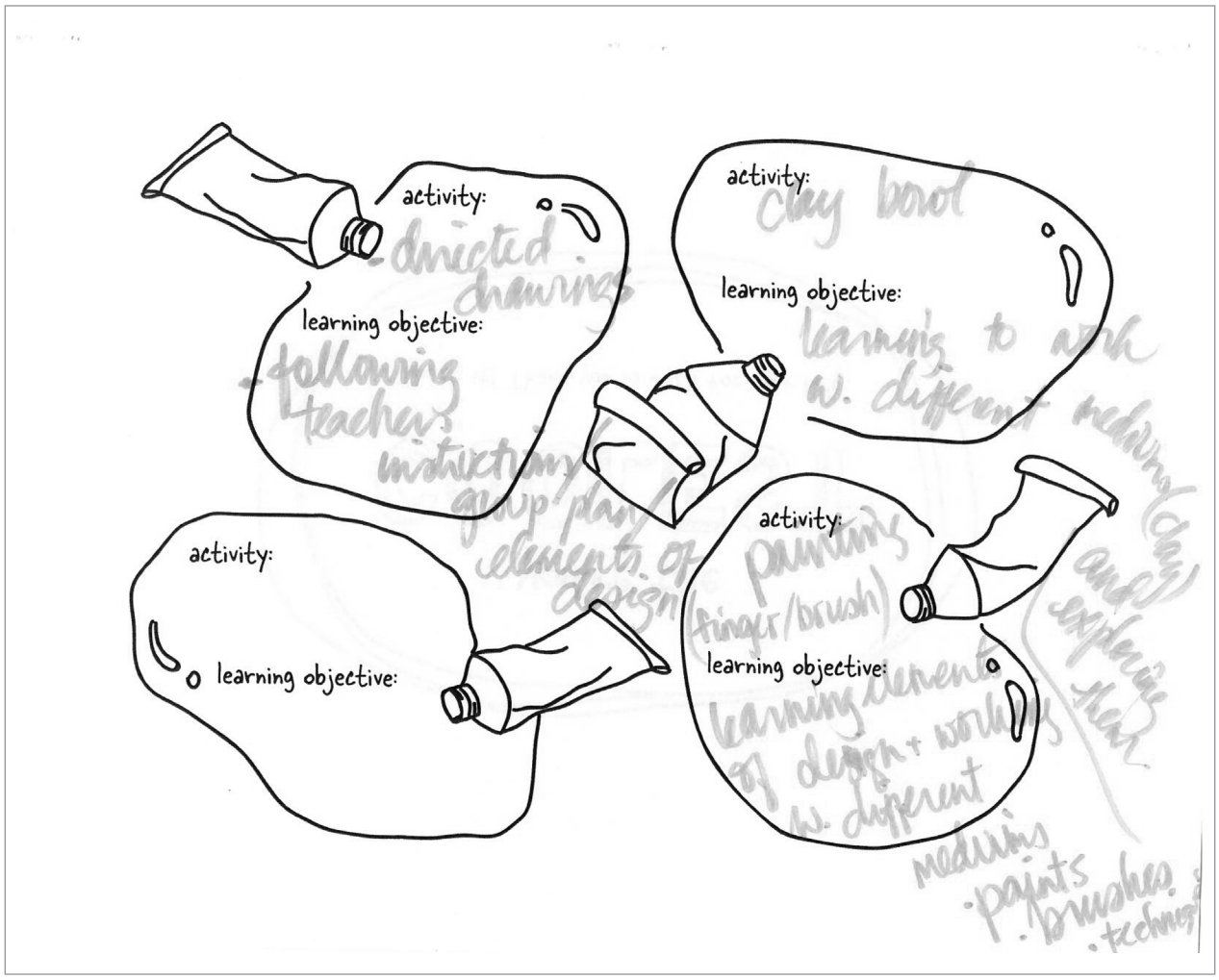
Response to the "Self-Regulation Tools" activity from Division 2 teacher



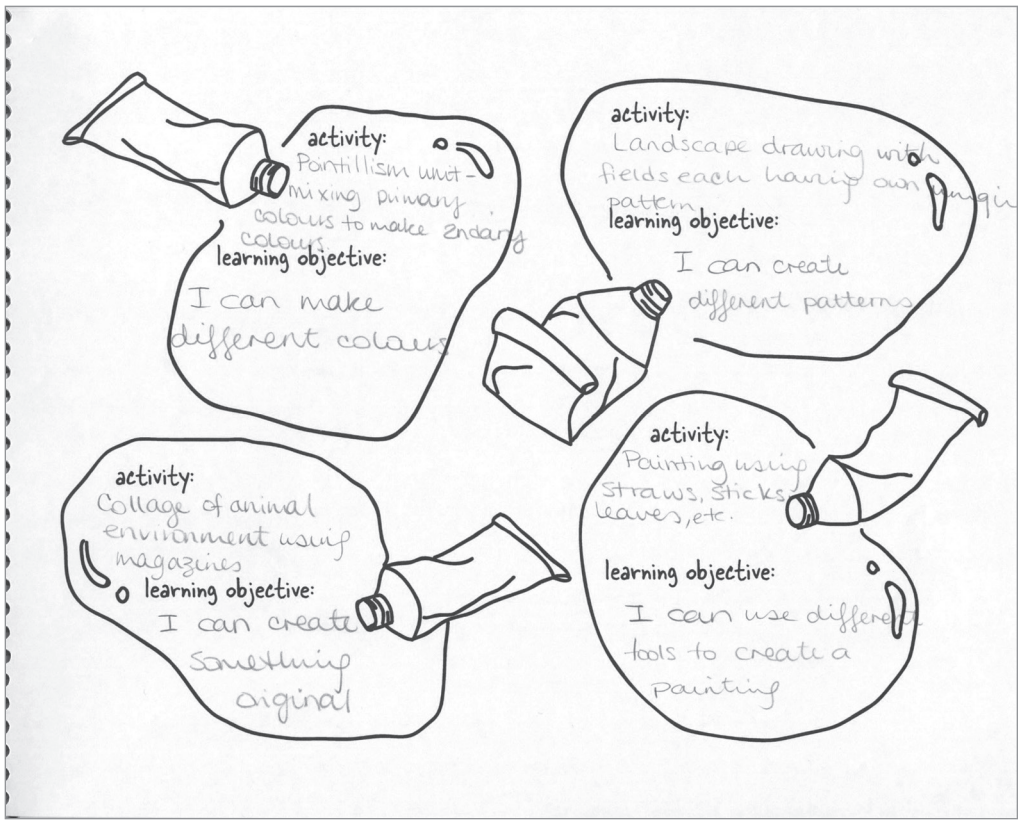


Response to the "Self-Regulation Tools" activity from Division 3 teacher

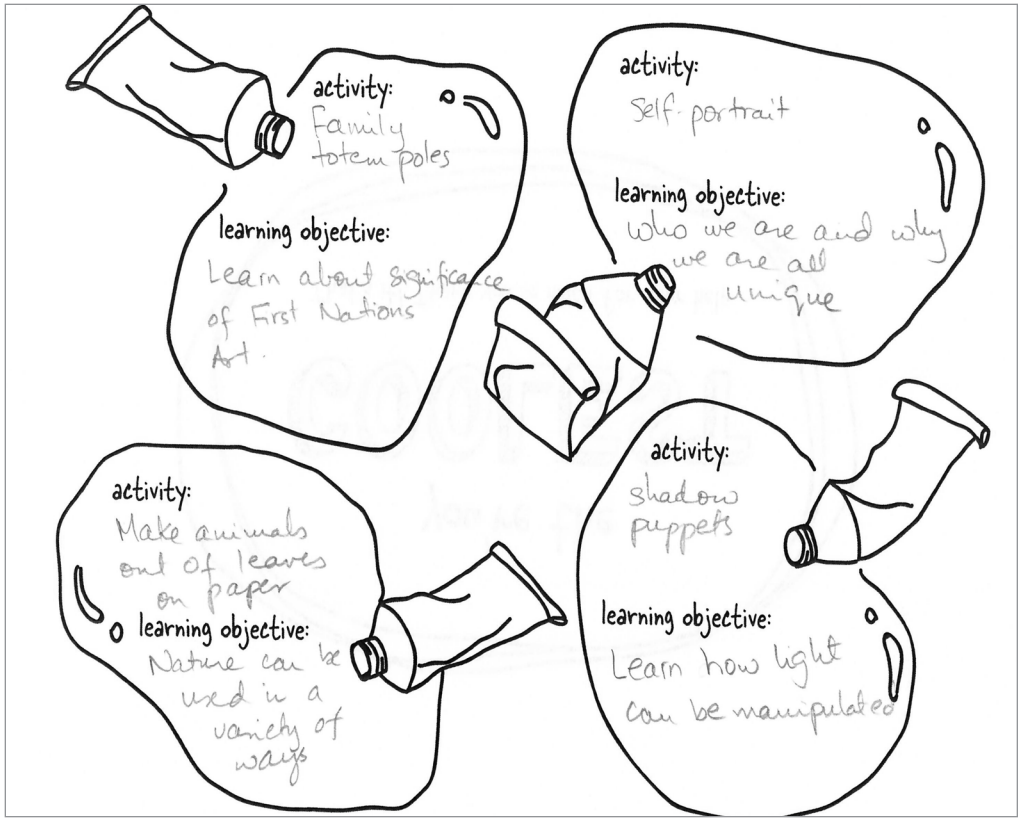




Response to the "It's Time for Art" activity from Division 1 teacher



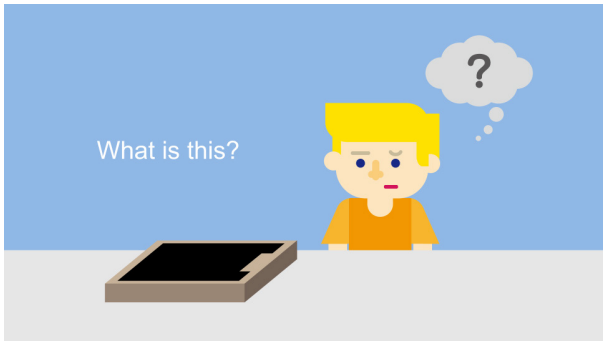
Response to the "It's Time for Art" activity from Division 2 teacher. The co-teacher did not respond to this activity.

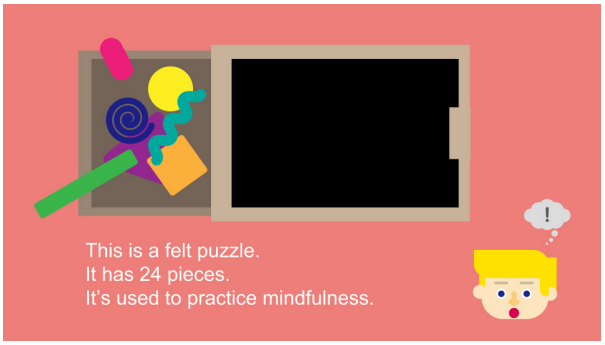


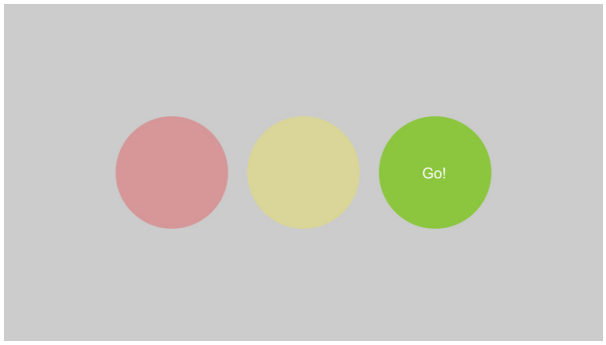
Response to the "It's Time for Art" activity from Division 3 teacher

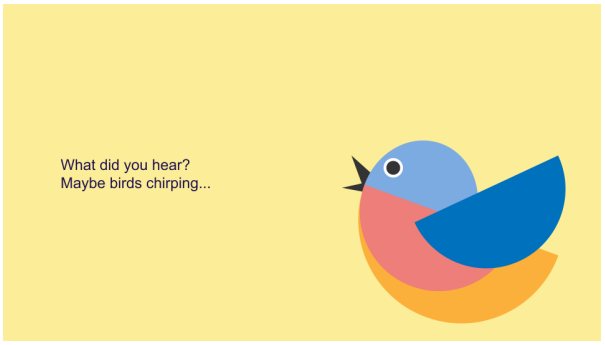
Appendix 2

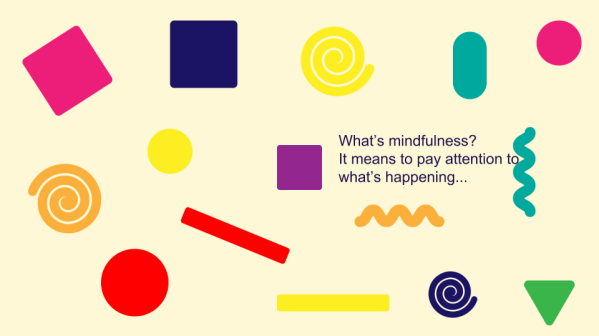
Slideshow for teachers to introduce the felt puzzle to their students



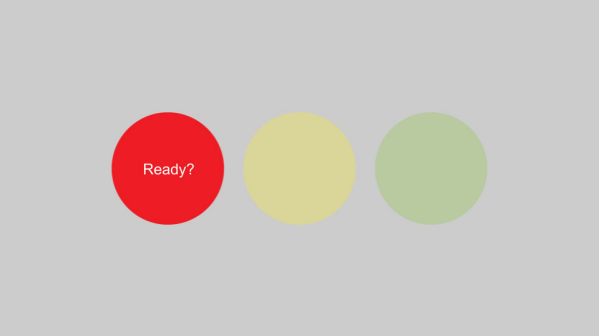


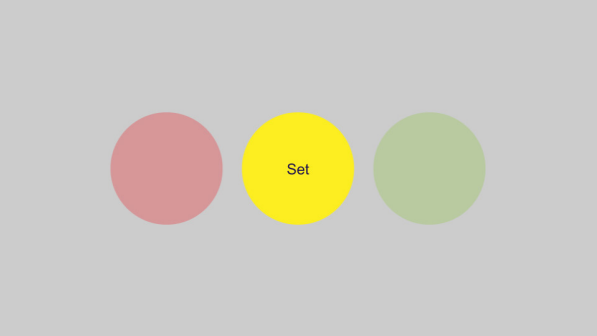


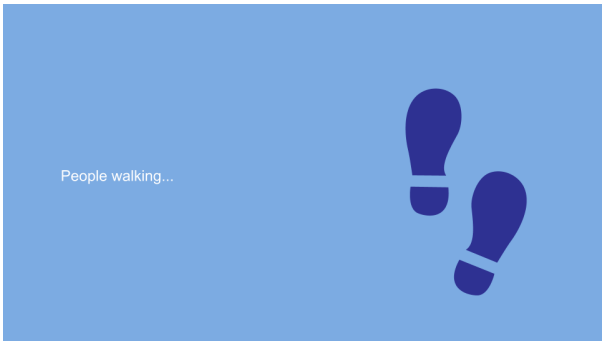


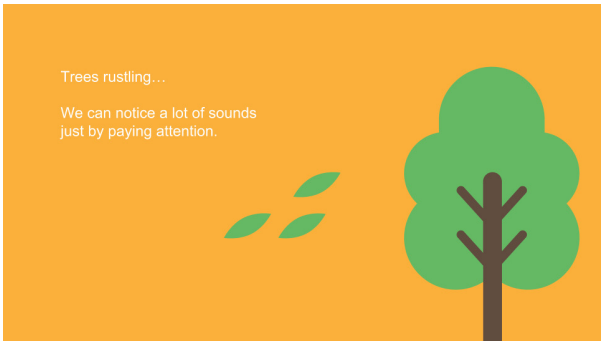

What's mindfulness?
It means to pay attention to
what's happening...

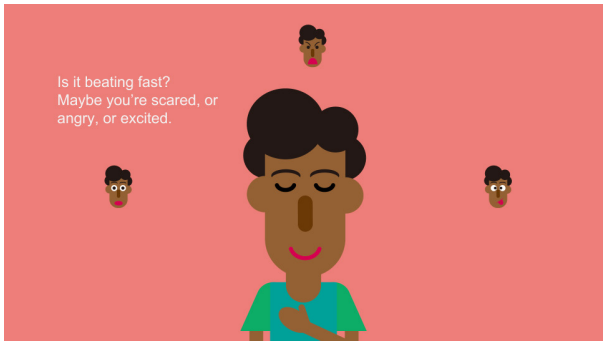

now.
Let's take a moment to be mindful.

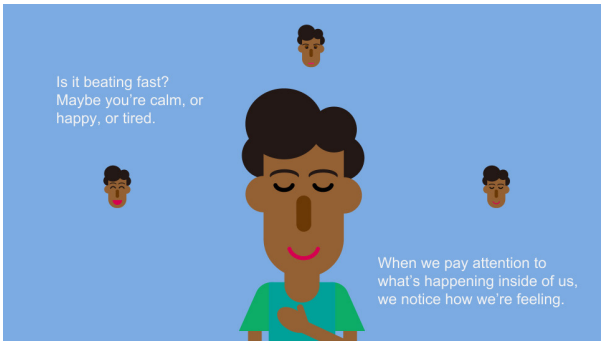

Ready?

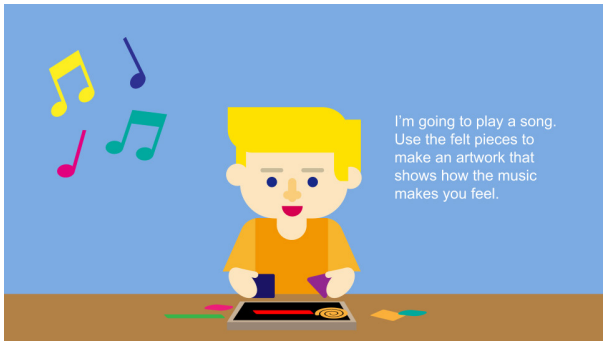

Set


People walking...

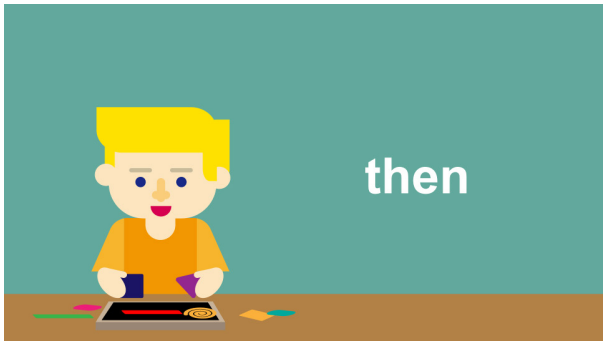

Trees rustling...
We can notice a lot of sounds
just by paying attention.

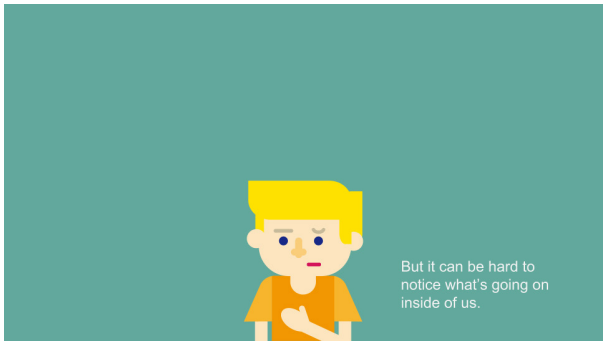

Is it beating fast?
Maybe you're scared, or
angry, or excited.

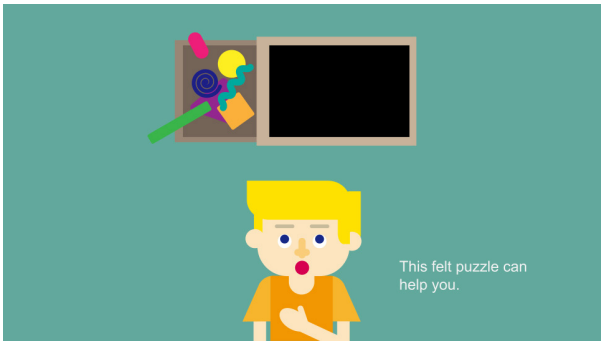

Is it beating fast?
Maybe you're calm, or
happy, or tired.
When we pay attention to
what's happening inside of us,
we notice how we're feeling.

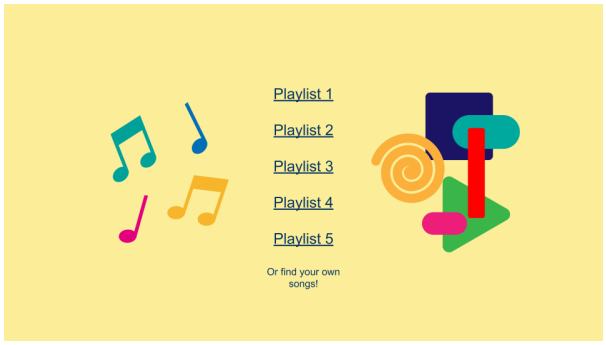

I'm going to play a song.
Use the felt pieces to
make an artwork that
shows how the music
makes you feel.

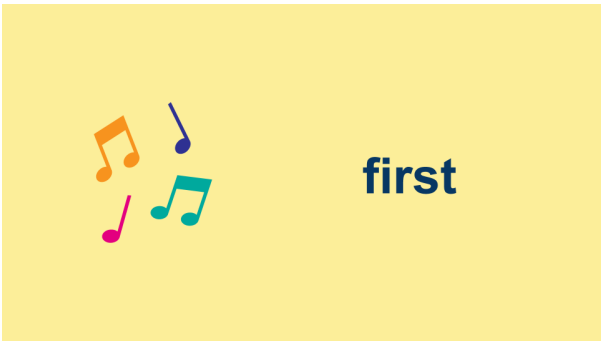

What colors does the
song make you think of?
What shapes or things
does it remind you of?


then


But it can be hard to notice what's going on inside of us.


This felt puzzle can help you.


Playlist 1
Playlist 2
Playlist 3
Playlist 4
Playlist 5
Or find your own songs!


first

Appendix 3

TCPS 2 Core Certificate of Completion

PANEL ON RESEARCH ETHICS
Navigating the ethics of human research

TCPS 2: CORE

Certificate of Completion

This document certifies that

Mariko Kuroda

has completed the Tri-Council Policy Statement:
Ethical Conduct for Research Involving Humans
Course on Research Ethics (TCPS 2: CORE)

Date of Issue: **27 October, 2017**