ART IN ACTION: ELEMENTARY ART AND EXECUTIVE FUNCTION

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ART IN ACTION: ELEMENTARY ART AND EXECUTIVE FUNCTION

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Dedication

This project is dedicated to my younger self. It is through my own struggles as a student that I became a teacher, and it is because of those struggles that I continue to research and learn.

To my colleagues, who even when they feel discomfort in teaching a subject area, they jump right in and do their best.

And to my husband, Kevin, who has supported me through every step of my career and this project.

Abstract

This project explores the intricate connection between cognitive functions and elementary art education, offering practical resources to support teachers in the development of their art teaching while supporting their students' creative and cognitive capacities. The specific cognitive processes investigated are those involved with executive function and the default mode network while participating in the creation of visual arts. Through the investigation of recent research, experience, environment, and expression are the themes through which resources were created and available through a wix.com platform. This project has been created from my own experiences as an educator and my personal struggles with ADHD in conjunction with the conversations I have had with colleagues regarding their confidence, or lack thereof, surrounding the teaching of art in elementary school. By using the resources and templates in this project my colleagues have been provided with a guide to help build their confidence in their art programming.

Keywords: art, executive function, default mode network, elementary art education, cognitive processes

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Introduction

Grano and Turunen (2022) define the experience of art as "the sum of the interactions between a person, a community, and art" (p. 143). This quote encapsulates my varied experiences that led me to the creation of this project. This project is a summation of learning and understanding my life with Attention Deficit/Hyperactivity Disorder (ADHD), my life growing up immersed in visual arts, and the experiences I had in my University art classes. It provides connection to my education community, my colleagues, students, and where I am placed as a teacher. It is my passion in teaching to engage with art mediums and methods.

Growing up, I believed and felt that there was something wrong with me as school days often ended in frustration and tears. These frustrations continued through my Undergraduate Degree and into my first-year teaching. Doing art at home was the place that I felt the most comfortable. Once I was diagnosed with ADHD at 24, it became abundantly clear that my frustration and tears were due to executive dysfunction. I had a hard time remembering simple instructions, struggled with organizing my thoughts and my environment to allow me to work on a task, and I would regularly fall apart when a small part of a plan changed. This diagnosis prompted me to learn more about ADHD on my own, leading to learning about the role the prefrontal cortex (PFC) plays in ADHD as it allows us to plan, organize, focus, remember instructions, and provides mental flexibility (Center on the Developing Child at Harvard University (CDCHU), 2020).

I was privileged to grow up with a professional artist for my mother which meant an art studio was a permanent fixture in our house. Canvas, paint brushes, acrylic paint, solid and liquid watercolours, watercolour pencils and markers, rubber, carving tools, stencils, spray paint, and many more art materials were available to me to use at any time. My mom ensured I was taught

how to properly use each material or art tool and then allowed me to create whatever I liked. When a day was particularly difficult at school, I would come home, sit in the studio with my mom, and create. I find that my brain is always filled with too many thoughts to focus on; yet stopping and working on a painting or in a sketchbook I was able to slow down my thoughts and focus on the task at hand.

Although I spent many hours creating at home, I encountered some negative experiences in art at school, causing added stress to the creative outlet I was accustomed to. In sixth grade, I had a teacher who would give a step-by-step activity involving cutting, gluing, and colouring. While the skills developed in activities that require following instructions closely, cutting, gluing, and colouring, are incredibly important to build, there was a lack of encouragement to take the skills acquired to create something new. While I followed the directions and used the same materials as the task required, I would add my own details. I still remember the project where we coloured a paper using a variety of crayons, painting over the crayons with black acrylic paint and allowing it to dry, and finally scraping off paint to make fireworks. I almost failed this project because rather than having nine waves coming out of each firework, I varied the firework types. I can still feel the tears I shed knowing my self-expression and sharing of the developed skills was not appreciated or welcomed. I refused to take another art class throughout my primary education, choosing to only create and build my art skills in the safety of my own home. Again, I was privileged to live with a parent who could introduce me to new art materials and techniques at home, otherwise I would not have had any more exposure to something that has been a constant source of calm in my life.

The next time I stepped into an art class was my second year of university. In the introductory studio art courses, I would participate in class discussions surrounding artists and

the mediums they worked with. Demonstrations were given and skills were practiced in class, then an assignment would be given with the expectation to use the skills and methods from class to create a piece that would showcase our own understanding and personal interactions with the mediums and ideas. There was a clear purpose to each assignment with the opportunity to make it our own. Stepping into a space structured very similarly to my mom's studio space allowed me to see that not all art spaces were reminiscent of my sixth-grade art class. The skills taught were to facilitate creative expression. Rather than the focus being on the product, as it appeared to be in my sixth grade classroom, much of the focus was on the process of creating the art as well as the experience of interacting with or viewing the art. Being immersed in a field that focused on developing the skills through the process became a large part of my pedagogy as an educator.

Stepping back into the sphere of the elementary classroom as an educator and through discussions with many colleagues, I began to realize how many of my coworkers struggled to teach art skills and to focus on the process of creating, rather than the product. In a school of roughly 30 staff members, only 2 I talked with felt like they could teach art to their students. While researching art education, I have come to find that these staff members are not alone in their discomfort teaching these skills, encouraging creativity, and/or shifting their focus from the product of student art to the process (Sotiropoulou-Zormpala & Mouriki, 2020; Szekely, 2022).

After living through the pandemic (COVID-19), the number of students struggling with executive function (EF) has significantly increased (Borba, 2023; Carlson & Zelazo, 2023; Naglieri & Kryza, 2023). Living with executive dysfunction myself, I began wondering how the feeling of focus I had during a visual art activity was connected. I began by learning more about EF, an area I go into greater depth on later in this paper and found myself consistently digging deeper in the developmental areas connected to visual arts. As I researched, the more I learned

how engaging with the visual arts resulted in greater neural connections in the PFC, the part of the brain connected to EF. Through this understanding I began to strengthen my own teaching of art, as I was able to focus on how best to build skills through the process, while also encouraging my students to use the skills to creatively express themselves. In conversation with my colleagues, I found they kept asking me how I came up with ideas on what to teach in art and how I taught it. From these conversations I decided to create a resource, Art in Action (Funk, 2023), for teachers that increased self-efficacy, built student EF skills to engage in authentic learning and learner empowerment. While considering the creation of this resource, I encountered Biesta et al. (2013) question "about how we can help our children and students to engage with, and thus come into, the world" (p. 5), a question that I believe is answered through this project and in the research surrounding art education.

Project Rationale

Teaching art is incredibly complex as I find myself wondering how to step back and give my students creative freedom while also building skills. As an educator, art has always held a space in my room just as all other subjects have. I plan lessons that teach skills or information but also encourage students to take their art in their own direction. Not only do I reflect on my firework art experience and the failure I felt in not being able to add my own details, but the literature also shows that giving students autonomy and choice in their product promotes greater growth (Anderson, 2018; Eisner, 2003, 2005; Erdt, 1954/62; Sheridan et al., 2023; Szekely, 2021). I have noticed my own students tend to be more willing to engage with an art project when a form of autonomy in the product is involved.

In my own school, I am the only teacher with an art background, and have heard the words "I hate teaching art" uttered weekly by various teachers, while others find the whole

process overwhelming. As I learned more about EF, the Default Mode Network (DMN), and brain processes during art, I realized why I often felt more focused and calmer while painting. I began initially researching EF and art separately; I was finding so many intertwining ideas, that I began to research them together. This lead to deeper understanding surrounding cognition and art education which is addressed later in this paper. I will be pulling from the theories and work of Eisner (2005), Efland (2002), Sheridan et al. (2023), Erdt (1962), and Heaton (2021). I will also be exploring recent cognitive science research showing how art naturally builds EF networks, divergent thinking (Beaty et al., 2016), and student brain development (De Pisapia et al., 2016; Tyler & Likova, 2012). When starting this project, I wanted to create a resource for teachers; a website with lesson plans for teachers to use in the classroom, yet as I worked through each step of the project, I began to realize creating step-by-step lesson plans went against everything I was saying and trying to create. My goal was to find a balance between skill building and creativity, yet creating a step-by-step plan seemed to feed back into the efficiency model (Friesen & Jardine, 2009). After many discussions with other educators, and reflection about how I teach my own classes, I have created a website that builds teacher knowledge surrounding EF and brain functioning. This website provides the link between EF and art in the classroom, and created guides that aid teachers in the planning of art lessons for their students [see Appendix A] along with example lessons [see Appendix B-E]. I have also included links to many websites and educators who can help further this learning. Rather than having lessons that will only be used once a year, I hope the guides I have created builds teacher capability in elementary art and will result in many planned art opportunities for their students. Each section of the website goes deeper into the research in teacher-friendly terms while offering resources such as explanatory videos, example lessons, and lesson guides to aid the teacher in their own learning process.

While creating the guides and example lessons, I used the concepts important in both art and EF, focusing on experience, environment, and expression, and based on research surrounding EF, DMN, and general cognitive sciences (Beaty et al., 2016; Borba, 2023; Carlson & Zelazo, 2023; CDCHU, 2020; Kolb et al., 2019; Pereone et al., 2018; Zelazo et al., 2016). This ensures that there is continuity among resources and allows teachers to begin at whatever stage they are comfortable with or ready for.

When addressing experience, I am referring to the interaction between an individual and other individuals, individuals and previous interactions, individuals and their senses (touch, taste, feel, smell, hear, and emotional connection) (Anderson, 2018; Eisner, 2003), the record created by an individual (Sotiropoulou-Zormpala & Mouriki, 2019), and understanding that any individual understanding of concepts is varied and unique (Szekely, 2021). Experience is a moment made meaningful (Pinar, 2019). The environment is an extension of experience, as it is within engagement of an environment that an individual can become aware of their space in the world (Eisner, 2003). The environment, in this case an elementary art classroom, can give a message to students about the work that is valued (Anderson, 2018). It can be the physical room, the expectations provided (Anderson, 2018), in what is valued (Grano & Turunen, 2022; Szekely, 2021), and the learning situations created by the educator (Eisner, 2003; Erdt, 1954/62). Through expression, I am referring to the sharing of thoughts, feelings, and ideas (Szekely, 2021). Not only does expression provide student agency, it is also the opportunity to share the things that matter most (Eisner, 2003).

Brain Functioning

The moment we interact with anything (such as the environment or other people), we are forming an experience and ultimately changing our brain architecture (Carlson & Zelazo, 2023).

Due to the multisensory and emotional nature of experience (Anderson, 2018), it is suggested that both top-down and bottom-up controls are at play during acts of art and creativity (Beaty et al., 2014). Top-down processing refers to how the brain makes sense of the external sensory information brought into the brain from previous experiences, and how it uses this information (Cherry, 2020). Bottom-up processing refers to immediate reactions to external stimuli (Cherry, 2023). Highly creative people tend to have greater control over top-down processes (Beaty et al., 2014), which could result in greater EF networks. Creativity and experience can "rapidly activate neural activity…leading to the release of dopamine and norepinephrine, as well as the glucocorticoid hormone cortisol" (Zelazo et al., 2016, p. 13), and with positive experiences, can lead to an improvement in neural connectivity. Other processes such as an increase in grey matter density in the left anterior cerebellum and right medial frontal gyrus (Kaimal et al., 2017) are involved in the creation of visual art.

Cognitive Sciences

The act of creating art and the development of brain architecture are inexplicably linked. By engaging in the production of creative ideas and the physical process of creating art, there is a reduction in cortisol levels and improvement in functional connectivity in the frontal and parietal cortices, resulting in stronger neural connections between EF and the DMN (Kaimal et al., 2007). This increase in connectivity is associated with improvement in motivation, creativity, innovation, academic achievement, and social skills (Kaimal et al., 2007; McArdle, 2008; Smithrim & Upitis, 2005).

The brain processes involved in the act of creating art are highly complex, so I will just give an overview of what occurs to aid in understanding them. Engaging in the act of creating, the visual information travels to the thalamus, and from there moves on to the visual region of

the occipital lobe (Kolb et al., 2019). From the occipital lobe, the information is divided into two streams: the ventral stream and the dorsal stream. The ventral stream leads to the temporal lobe for object identification; working with conscious awareness to understand the perceptual information of the environment. The dorsal stream leads to the parietal lobe to guide movement with automaticity; controlling movements like reaching and manipulating objects. The motor cortex is informed by the somatosensory cortex, which identifies and interacts with spatial locations of objects in the environment, informing the body which body part to use in the interaction.

Neocortical layers are activated through the combined need for both the motor and sensory areas, then the frontal lobe is activated in the integration of both functions. Addressing the planning needs during a creative activity activates the primary motor cortex (Kolb et al., 2019). Participating in an art activity also activates the parietal lobe through tactile engagement. In many activities, the basal ganglia are also activated to control and coordinate movement. The basal ganglia modulate the activity of the cortical motor systems which result in a wide range of functions, including learning, motivation, emotion, and motor control. Dopamine cells of the midbrain substantia nigra send information to the basal ganglia, which then connect to the thalamus and relays information to the motor cortex.

Eisner (2003) refers to cognition as the “processes through which the organism becomes aware of the environment or its own consciousness” (p. 9). There has been a misconception that art is a purely emotional and physical event as it did not include the learning involved in subjects such as math or social, however through contemporary research, it is clear that art is a cognitive event (Efland, 2002). The arts are perhaps the best way to "accidentally" target and improve brain functioning in our young students due to the activation of the DMN, the visual and

perceptual awareness that is activated, the motor skills that are targeted, the activation in the PFC, and the dopamine created in art interaction.

Executive Function

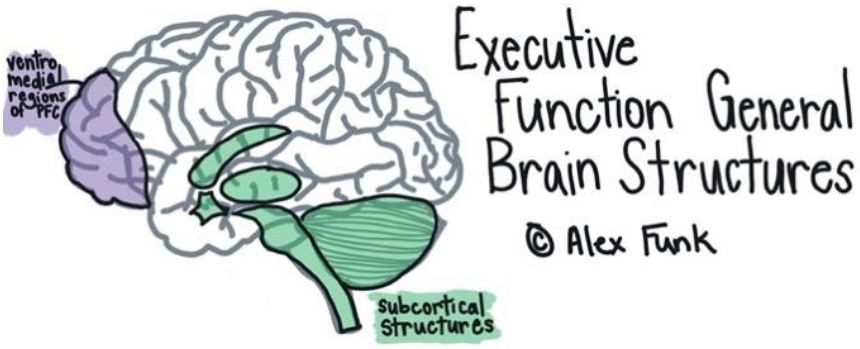

Figure 1: Artistic rendering of EF general brain structures showing ventromedial regions of PFC and subcortical structures.

EF supported by the PFC, as seen in Figure 1, and consists of working memory, inhibitory control, and cognitive flexibility (Carlson & Zelazo, 2023; Perone et al., 2018; Zelazo et al., 2016). It is often referred to as 'the air traffic control center' of the brain (CDCHU, 2020) as it controls most actions and processes. EF is a "set of top-down neurocognitive processes that underlie the regulation of thoughts, emotions, and actions (Perone et al., 2018, p. 291). It allows us to initiate tasks, focus and complete tasks, hold attention, organize, respond, and react appropriately to a given situation, manage and understand time, and control and regulate emotions. (Carlson & Zelazo, 2023; CDCHU, 2020). These EF processes can either be 'hot' or 'cool' in nature; while hot EF processes operate during real-life contexts, cool EF operates in a controlled environment, like a laboratory, separate from real-world events (Perone et al., 2018; Zelazo et al., 2016).

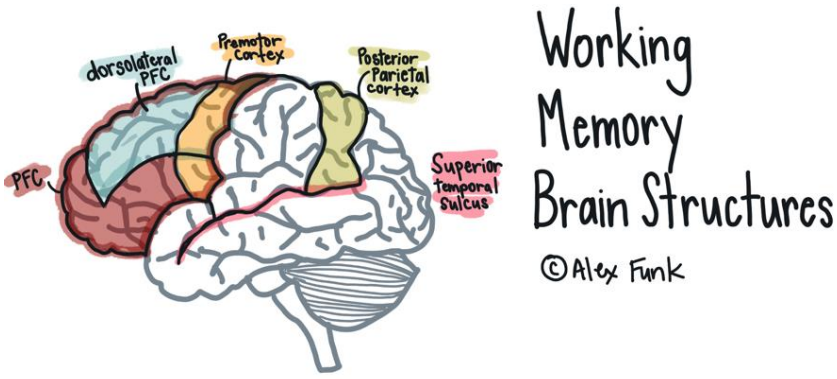

Figure 2: Artistic rendering of working memory brain structures showing PFC, dorsolateral PFC, premotor cortex, posterior parietal cortex, and superior temporal sulcus.

Figure 2 illustrates how the PFC is activated with working memory while the dorsolateral PFC makes reciprocal connections with the posterior parietal cortex and superior temporal sulcus to determine behaviour and movement. The premotor cortex then receives and sends the information to the body (Kolb et al., 2019).

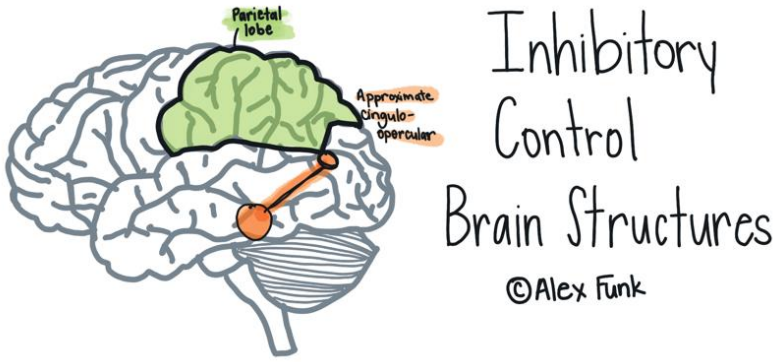

Figure 3: Artistic rendering of inhibitory control brain structures showing parietal lobe and cingulo-operculer network.

Inhibitory control, as illustrated in Figure 3, activates the parietal network as it is involved with moment-to-moment control, while the cingulo-opercular network (including dorsal anterior cingulate/medial superior frontal cortex and thalamus) is involved in longer term control.

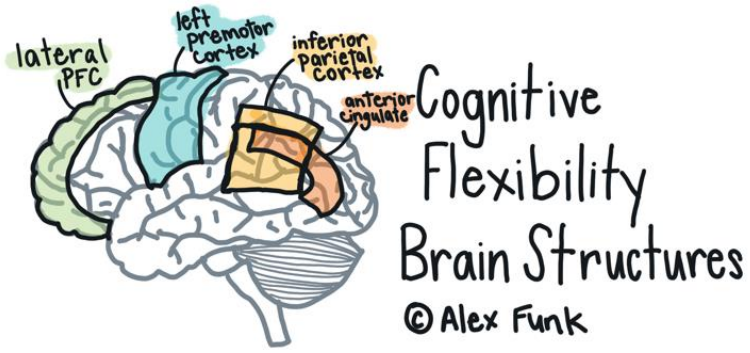

Figure 4: Artistic rendering of cognitive flexibility brain structures showing lateral PFC, left premotor cortex, inferior parietal cortex, and anterior cingulate.

Figure 4 illustrates how cognitive flexibility activates the lateral PFC, anterior cingulate, left premotor cortex and inferior parietal cortex (Perone et al., 2018). EF processes also require activation of the ventromedial regions of the PFC, including orbitofrontal cortex, the rostrolateral region, and subcortical structures like the basal ganglia (Perone et al., 2018; Zelazo et al., 2016). Dopamine and norepinephrine signal engagement of the PFC, feeding back to the limbic system and brainstem (Kolb et al., 2019; Zelazo et al., 2016). This feedback loop shows that experiences develop and modify EF processes while EF processes modify and develop experiences (Zelazo et al., 2016). Negative experiences, such as the most recent pandemic, poverty, or neglect, can negatively impact EF development and use, while positive experiences, such as art, mindfulness, and play can improve EF development and use (Carlson & Zelazo, 2023). Zelazo et al. (2016) state that “EF has less to do with possessing intellectual knowledge than it does with being able to reason – to use knowledge purposefully and put into practice” (p. 4). Figure 5 demonstrates the functions related to working memory, inhibitory control, and cognitive flexibility.

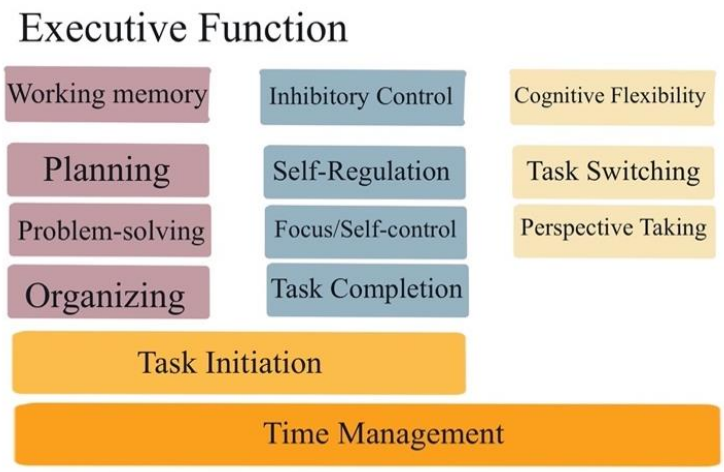

Figure 5: Graphic showing the breakdown of EFs.

Default Mode Network

The DMN is closely tied to EF, previously believed to function in opposition of the EF networks. Recent research suggests that rather than working at separate times or in opposition of each other, it seems that in some activities, the two systems work together. The DMN is found in the ventral medial PFC, the dorsal medial PFC, the posterior cingulate cortex and adjacent precuneus, and the lateral parietal cortex (De Pisapia et al., 2016; Raichle, 2015). While EF is the form of control in the brain, the DMN oversees spontaneous thinking (De Pisapia et al., 2016). Spontaneous thinking is defined by De Pisapia et al. (2016) as "a mode of mental activity in which the association between the flow of thoughts, emotions, images, sounds and so on is less regulated, in a continuous stream of internal processing" (pp. 1-2). Previous studies showed that when activity was increased in EF networks, there was a decrease in activity in the DMN, leading researchers to believe that these two functions worked in opposition of one another. However, new research is showing that when creativity is involved, the two networks work together, with the EF network 'supervising' the DMN (Beaty et al., 2014).

While the EF is considered the air traffic control center, the DMN is like the brain on autopilot, however when engaged in activities such as mindfulness and creativity, the DMN seems to act with a greater purpose, using the EF network as a guide (Beaty et al., 2014). Current research suggests that while engaging in the act of creativity, there is a reduction of competition between the EF network and the DMN (De Pisapia et al., 2016), which engages divergent thinking (Beaty et al., 2014). Eisner (2003) unknowingly refers to the DMN when discussing the importance of art education as it "is the importance of taking one's time to relish the experience that one seeks" (p. 207). In art, this looks like the convergence of imagining an idea, following through and creating what was imagined, having flexibility to be able to accept when the idea may not be working as planned, then problem-solving and re-imagining.

Cognition in Art

Efland (2002) does an in-depth analysis of the theorists and researchers who have impacted the field of cognition and art education, however much of his research is connected to Piaget and Vygtozky. Piaget is known for breaking intellectual development into four stages: sensorimotor in ages 0-2, preoperational thought in ages 2-7, concrete operations in ages 7-11, and formal operations in ages 11-15 (Efland, 2002, p. 27). The stages of development are due to interactions with the environment of an individual. Vygotzky was researching at the same time as Piaget, believing that individuals use signs, instruments, and tools to gain knowledge, regulating behavior through the modification of external stimuli (Efland, 2002). From this, Vygotzky created the zone of proximal development, the zone where the learning is not too easy that interest is lost and not too difficult that frustration builds to quitting. This led to later research focusing on representation through symbolism. Efland (2002) makes the case that many of the theories and research in cognition and art education are due to these two theorists. Many of

the cognition and art education researchers I include in this project cite Efland (2002) in their own work and also discuss or fall in the category of Piaget or Vygotzky's thinking.

Heaton (2021) attempts to clarify the role of cognition in art education through pre-service and beginning teachers. As a way to conceptualize cognition and it's engagement in art education, Heaton (2021) provides a framework (p. 1325), breaking down the concept of cognition into cognitive forms (knowledge, process, interdisciplinary, and embodiment), cognitive influences (arts, connections, internal experiences, and external experiences), and cognitive applications (clarify and transform, understand and connect, document and apply, and construct and experience). Cognition in art processes includes perception, representation, and connections, making it a "knowledge-acquiring process" (Heaton, 2021, p. 1326). When using the term cognition, I am referring to the thinking being built in the art classroom.

Much of my project works in conjunction with Sheridan et al.'s (2023) eight studio habits of the mind (understand art worlds, develop craft, engage and persist, envision, stretch and explore, reflect, express, and observe) within the studio framework (demonstration, students-at-work, critique, and exhibition). The work of Sheridan et al. (2023) echoes my own beliefs surrounding the unique skills and thinking acquired in the art room, which will be clarified through environment, experience, and expression.

Environment

Every engagement with an environment is a new connection in the brain and a new perspective with the next environmental engagement (Anderson, 2018; Eisner, 2003; Zelazo et al., 2016). Eisner (2003) refers to the term cognition as "all those processes through which the organism becomes aware of the environment or its own consciousness" (p. 9). Our job as teachers is to create the environment for our students to engage with and learn from, becoming

aware of themselves. Every subject requires norms and expectations when students enter the environment, yet art is often left without or the plans are too controlled (Eisner, 2003; Erdt 1954/62; McArdle, 2008; Sotiropoulou-Zormpala & Mouriki, 2019). Many elementary school teachers may mention that they do not have a dedicated art room when addressing the environment, making it difficult for them to create this space. However, when referring to environment, I am referring to the feeling, the time, and the norms surrounding art class. Eisner (2003) states that teachers must act as environmental designers, creating not only tasks but situations that engage students. Grano and Turunen (2022) and Szekely (2021) also address the learning environment, emphasizing open dialogue and room for questioning from students, encouraging exploration with support. These are reminders that while an art classroom may not always be accessible, the environment is created by the teacher. I have taught art out of my own classroom for the majority of my career, just as I have taught every other subject from my room, however, the expectations and feeling surrounding the subject is what is most important to foster growth and development (Erdt, 1954/62; Szekely, 2021; Zelazo et al., 2016). Sheridan et al. (2023) addresses the physical environment, sharing that the art environment is a flexible space that promotes workflow, using different types of music and seating (p. 13). To create an ideal environment for creating art in the classroom, there are four common themes that continue to emerge from the literature, illustrated in Figure 6 and are: purpose (Eisner, 2003; Erdt, 1954/62; McArdle, 2008; Perone et al., 2018; Zelazo et al., 2016), autonomy (Anderson, 2018; Dewey, 1997; Eisner, 2003; Sheridan et al., 2023; Szekely, 2021; Zelazo et al., 2023), success (Anderson, 2018; Eisner, 2003; Erdt, 1954/62; Sheridan et al., 2023; Smithrim & Upitis, 2005), and reflection or metacognition (Carlson & Zelazo, 2023; Eisner, 2003; Heaton, 2021; Sheridan et al., 2023; Tyler & Likova, 2012). While these four themes are found in many classrooms, it is

the thinking and skills that emerge from them that make them unique. In most classes students are required to export knowledge, in the art classroom students are required to import knowledge, which involves using knowledge in a way that produces something (art) meaningful (Sheridan et al., 2023).

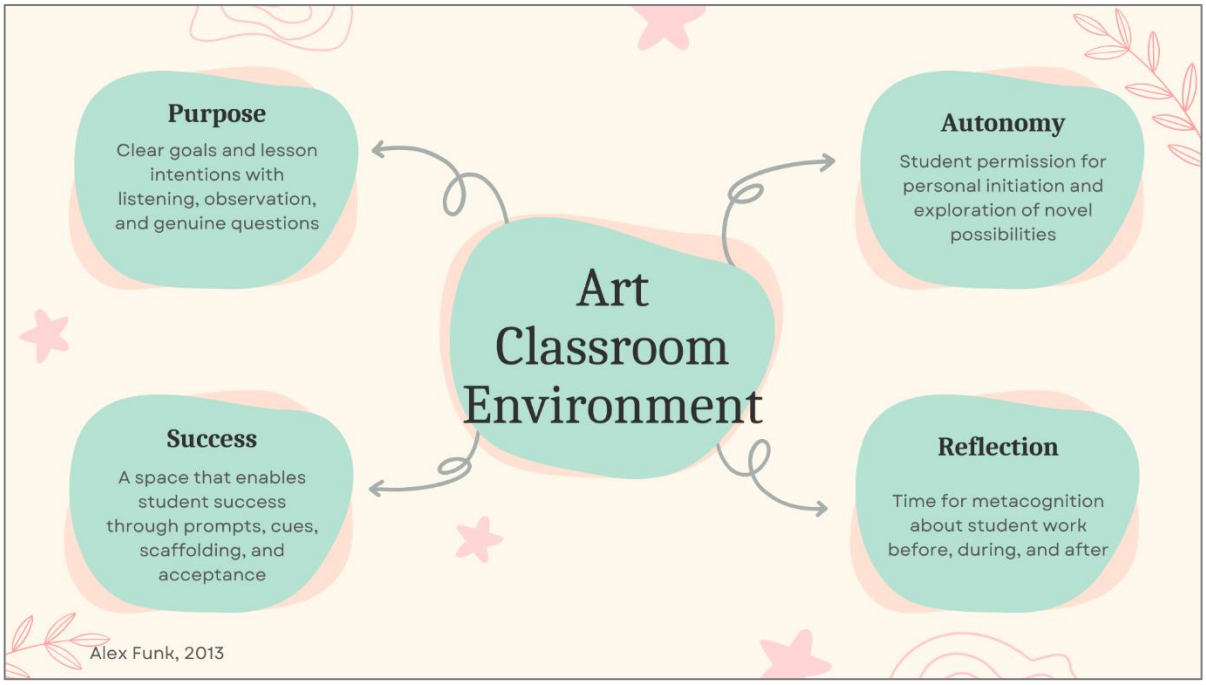

Figure 6: Breakdown of the art classroom environment, made up of purpose, autonomy, success, and reflection.

Purpose

The art environment allows greater personal initiative than many classes, The purpose of a lesson can be simply exploring one element of art, engaging with different materials, engaging with artists' work, or engaging with a concept or topic. Identifying the goal of the lesson allows the teacher to plan a lesson open enough to encourage student initiative and exploration but closed enough to focus comments and engagement. I believe having a purpose or goal also allows for the teacher to veer from the lesson plan when the students discover interest or passion.2018). Through studies of various art teachers, Sheridan et al. (2023) found a structure

for teachers that helps build the purpose in an art class through four domains, demonstration – lecture, student-at-work, and critique, and exhibition. While these four may be rearranged within a lesson, they are found in all successful lessons. Taking time to teach the material or about the artists as well as to present the assignment gives students direction for their work. Not only does this give students a clear purpose in the assignment they are working on, it also gives the teacher a clear purpose in how they lay out their lesson. A good portion of the class time is spent with students-at-work, giving the teacher time to confer, aid students with areas they are struggling in, and push those who may need to think deeper about their work. Finally, spending time on a critique and putting together an exhibition allows students to take their own artwork in different directions than they would have thought of on their own and gives students a clear purpose on where they would like to go with their artwork.

Autonomy

Student motivation and authentic engagement is improved through student autonomy (Erdt, 1954/62; Perone et al., 2018; Smithrim & Upitis, 2005). Offering student choice in the art classroom encourages students to envision, problem-solve, collaborate, and reflect (Hogan et al., 2020). While the material, skills and techniques, or processes are the same within the assignment for the class, giving the opportunity to choose how to showcase the learning and knowledge that has been acquired encourages students to stretch and explore, engage and persist, express, observe, and reflect (Sheridan et al., 2023). Moving towards a process focused art class from a product focused class can result in greater student autonomy and agency and build greater skills and habits surrounding cognition and thinking (Hogan et al., 2020). When approaching skill building with student autonomy in mind, asking students to share the why behind their decisions and choices allows the teacher to understand where the student may need supports or challenges

and encourages students to think about why they make the choices in their art expression (Sheridan et al., 2023). I have placed autonomy as a key element of the art classroom environment, as it is cultivated by the teacher through the assignments given and expectations set up. Eisner (2003) refers to autonomy as being a part of the classroom norms, while Szekely (2021) shares that a successful art classroom avoids making students feel inadequate; teachers must trust students to create autonomously. The level of autonomy provided in the art classroom is unique from any other room as it is not constrained by standardized tests or memorizing information (Sheridan et al., 2023).

Success

The third element is that of success. Having a focused goal allows the teacher to have an understanding of scaffolding, prompting, and building success in students (Eisner, 2003; Erdt, 1954/62). If students are focusing on the element of lines, by giving an opportunity to utilize lines in any way they like allows the teacher to ask guided questions about the work and the goal and gives the student a greater chance at achieving success. Creating an environment that accepts and encourages autonomy, taking what has been learnt and incorporating it into an art piece in a way that the student understands encourages student success, thereby creating motivation and engagement (Anderson, 2018; Eisner, 2003; Erdt, 1954/62; Smithrim & Upitis, 2005). Dedicating time to conferring allows the teacher to ask guided questions. Adding support when a student may be feeling frustrated or adding challenge when an assignment may be too easy allows the teacher to personalize the learning while helping the child feel successful.

Reflection

Finally, giving time for reflection and encouraging metacognition (Carlson & Zelazo, 2023; Eisner, 2003; Tyler & Likova, 2012; Zelazo et al., 2016) before, during, and after

producing artwork not only gives students time to really invest in their artwork, but it also engages the EF network and DMN, regulating systems while giving students the time to experience art in the way they need (Carlson & Zelazo, 2023; Eisner, 2003; Perone et al., 2018; Zelazo et al., 2016). Reflection also ties back to autonomy, as giving students choices engages metacognition and automatically promotes self-regulation (Carlson & Zelazo, 2023). Reflection is one of the eight studio habits of mind (Sheridan et al., 2023), referring to metacognition and evaluation. Thinking metacognitively in the art classroom requires the student to think about why a decision was made during the creation process, while evaluation is when a student judges their own work or the work of others. Both types of reflection should be instigated by the teacher to ensure students learn the language and thinking required. Having students answer questions while conferring with them allows them to share their thoughts, ideas, and decision-making processes surrounding art creation. Taking the time for students to step back and look at their own work in relation to others and having them discuss encourages them to begin thinking in terms of what they can do next or what they can do differently moving forward.

All environments and curriculum activities "have an impact on students' thought processes" (Eisner, 2003, p. 151). Whether the environment is considered or not, students will be impacted and the way they engage with the world will be changed (Eisner, 2003; Szekely, 2021; Zelazo et al., 2016).

Throughout this project, I often come back to the feeling of stepping into my first studio course in university. While the physical studio environment was open and flexible, the professors created a space that built a sense of community through demonstrations, independent work time, and critiques. We were engaging in the studio habits of the mind as students. The demonstrations and assignments had a clear purpose, however we had autonomy to engage with our assignments

in ways that were personal. Professors spent time conferring with us, personalizing our learning while challenging us to think about the next steps. While many elementary school teachers do not have a physical studio space to use to teach art, we are able to provide the same elements of purpose, autonomy, success, and reflection. We are also able to make our own classrooms a place that provides flexibility in where our students work and the sounds (music) of the room. The classes I took encouraged all four elements that create a positive classroom environment, changing my engagement in the space. It is an educators job to expand experiences while also providing a safe space to encourage exploration and personal interpretations (Eisner, 2003; Alberta Education, 2023).

After much reflecting and engaging in many art lessons with my students, I created a lesson plan sheet that focuses on creating a positive art environment. This lesson plan helps teachers to take the time to narrow down their focus or purpose of an art lesson and guides the user to consider areas for student choice, and ways to promote student success and reflection. To accompany this lesson, I recognize that metacognition is necessary for adults as well, so I have created a reflection sheet to accompany the lesson.

Experience

Eisner (2003) states that "experience is the medium of education" (p. 3). As educators, everything we plan can influence our students through experience, which results in the development of all cognitive and intellectual abilities as every experience is a moment of learning (Carlson & Zelazo, 2023; Eisner, 2003). Although we cannot decide for each student what they will learn, as their past experiences inform how they approach and engage with present experiences, we can create positive learning experiences in the art classroom to influence their learning (Anderson et al., 2019; Carlson & Zelazo, 2023; Eisner, 2003). As mentioned earlier, art

education teaches modes of thinking that are not the central focus in other classes (Sheridan et al., 2023). Much of the time spent in art class is creating and sharing, meaning students are engaged and experiencing different materials, thoughts, emotions, and challenges through most of their art time. The creative process is filled with unpredictability and requires problem solving (McArdle, 2008), resulting in completely different products depending on the process explored (Eisner, 2005; Erdt 1954/62; Gascoyne, 2017; McArdle, 2008). Using the elements provided in the previous section allows teachers to create a classroom experience that promotes deeper thinking. Experiences in the art room result in the ways students engage with and make meaning of the world. The immersive experience of art (Eisner, 2005) awakens "the heart and mind" (Montessori, 1912, p. 23), resulting in organic connections to learning (Dewey 1997) and the natural interactions within the brain to build EF skills (Pisapia et al., 2016; Tyler & Likova, 2012). Through art, "children learn to judge and learn to be flexibly purposive" (Eisner, 2005, p.63). The experiences and thinking that are enacted in the art class involve perspective taking, emotional understanding, meaning making, and are multi-sensory.

Perspective Taking

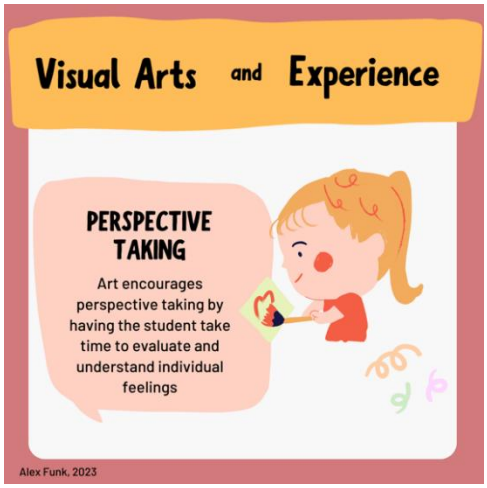

Figure 7: Perspective taking in art.

Figure 7 addresses perspective taking in art as it encourages evaluation and understanding of others feelings. The act of perspective taking involves the EF networks in the PFC and DMN and is often considered a higher-level skill (Beaty et al., 2014; Carlson & Zelazo, 2023). To be able to see others points of view, one must step outside of themselves and step into the shoes of someone else, seeing a perspective that they may or may not agree with. This requires the EF network to engage (Carlson & Zelazo, 2023). Perspective taking is engaged in observations and reflections made while viewing art (Szekely, 2021). Art is a way for students to connect with and understand the world (Sheridan et al., 2023). Students are given the opportunity to reflectively evaluate where they feel they belong while also seeing how others see their place in the world.

Emotional Understanding

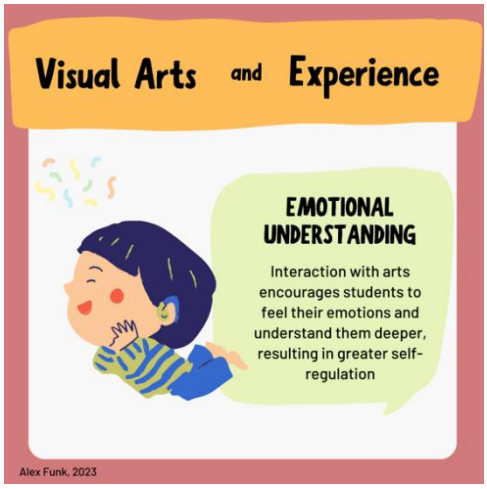

Figure 8: Emotional understanding in art.

Emotional understanding is the skill of being able to recognize and accept emotions while expressing them in a socially acceptable way, as explained in Figure 8 (Zelazo et al., 2016). Again, the EF network is enacted through emotional regulation (Carlson & Zelazo, 2023). The experience of discussing emotions through art as well as creating art engages the pre-frontal cortex and the DMN, naturally engaging regulation (Erdt, 1954/62). The arts aid us in

discovering our emotional selves (Eisner, 2003) while also developing the skill to use emotion in a productive way (Anderson, 2018).

Meaning Making

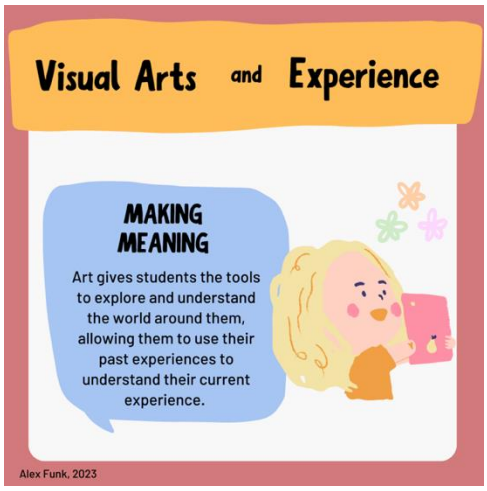

Figure 9: Making meaning through art.

Our students are making meaning with every experience throughout the day, art class is no exception. Students build language and neural networks through past experiences to engage in the present, illustrated in Figure 9. Through art, students are making meaning of the current world and are exploring their place within the world. This allows them to filter through their thoughts and feelings and gives them a positive and socially acceptable way to express and experience (Anderson, 2018; Eisner, 2003;). Experience shapes how we view and interact with the world (Carlson & Zelazo, 2023; Dewey, 1997; Grano & Turunen, 2022); ultimately it is how we make meaning of the world around us and our place within it. Eisner (2003) states that "art is a mode of human experience that in principle can be secured whenever an individual interacts with any aspect of the world" (p. 10). Art is the ultimate cognitive event that allows our students to truly understand the world (Anderson, 2018; Beaty et al., 2014; De Pisapia et al., 2016; Eisner, 2003; Tyler & Likova, 2012).

Multi-Sensory

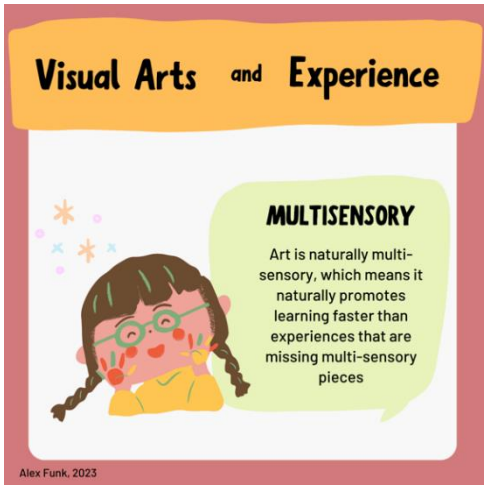

Figure 10: Multisensory experiences and art.

Finally, all educational experiences are multi-sensory, which makes art the perfect place to incidentally build EF networks. Figure 10 addresses how multi-sensory experiences promote deeper engagement and cultivate the imagination (Eisner, 2003). To construct meaning, as referenced above, a multi-sensory experience is required (Anderson, 2018; Lewington et al., 2021). Lewington et al. (2021) shares that "as sensory processing develops, better organization and more complex skills are attainable through the improvement of the adaptive response" (p. 2), which results in greater success with problem-solving and challenging situations moving forward.

Expression

When considering expression in art, we must consider autonomy, voice, and creativity. Our students have important thoughts and emotions to share, however they have not yet learned ways to regulate or appropriately communicate them, as this requires practice and development of the PFC (Carlson & Zelazo, 2023; Szekely, 2021). To develop these skills, students need practice in a positive and open environment. When creating an environment that supports

positive art engagement, the choice offered to students can easily be made through independent expression. An environment that celebrates unique art and creativity develops both the skills of the artist and the EF networks and DMN (Anderson, 2018; Beaty et al., 2014). Rather than having students making "adult art" (Szekely, 2021, p. 13), something teachers often attempt to do, students need the time and space to express their learning in a way that connects and resonates with them (Eisner, 2003; Tyler & Likova, 2021). When developing a purpose or focus for a lesson, the teacher can then identify the areas students can explore, inquire, and play (Szekely, 2021).

Creativity

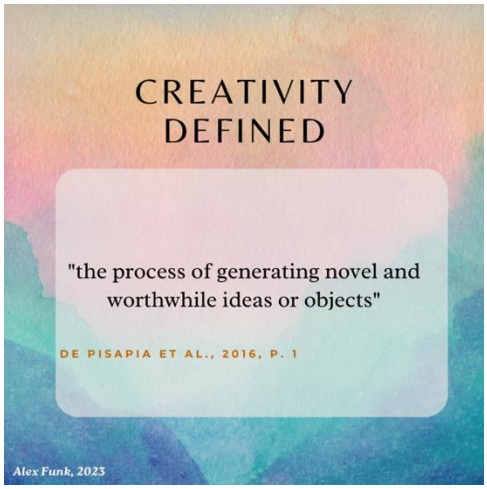

Figure 11: Definition of creativity (De Pisapia et al., 2016, p. 1).

De Pisapia et al. (2016) defines creativity in Figure 11, a skill that research is finding to include EF networks and the DMN working together (Beaty et al., 2014; De Pisapia et al., 2016). In this context of the work of De Pisapia et al. (2016), what is worthwhile is individually curated and decided. This is a skill many students come to school with, yet it is something that tends to fall by the wayside (Szekely, 2021). The implementation of "the efficiency movement" (Friesen & Jardine, 2009, p. 9) resulted in "de-skilling" (p. 12) and a decrease in creativity. The goal for

the teacher became inserting knowledge into a child rather than engaging in learning (Jardine et al., 2003). In personal experience, I often see students coming into grade two or grade three expecting to be given explicit directions involving prescribed colouring and/or cutting (McArdle, 2008) rather than looking forward to engage, "create, explore and express themselves" (McArdle, 2008, p. 366). The difficulty with cultivating a community of creativity is that the educator must let go of some control and allow the student to express their process (Eisner, 2003; Eisner, 2005; Gascoyne, 2017; McArdle, 2008). Creativity yields products that are unpredictable, something that can be difficult to measure as a teacher (Eisner, 2005), however, engagement in art not only improves educational connections, it also improves inhibitory control, emotional, and behavioural states (Anderson, 2018; Gascoyne, 2017). It encourages an "understanding of the world and their interactions with it" (Eisner, 2003; Gascoyne, 2017, p. 274). This relational piece is essential in the process of learning and is not available in all subject areas (Eisner, 2005). Creativity seems to be a balancing act of "top-down executive control and more free-thinking/mind-wandering processes" (De Pisapia et al., 2016, p. 8). It was originally thought that creative people lacked cognitive and behavioral inhibition, yet current research shows creativity is a highly cognitive demanding skill (Benedek et al., 2014). Creativity is a vehicle for meaning making, allowing students to explore their understanding of themselves as well as those around them (Anderson, 2018; Eisner, 2003; Grano & Turunen, 2022).

Art in elementary school can encourage risk-taking (Biesta et al., 2013; Tyler & Likova, 2012), creative awakening (Greene, 1995; Montessori, 1912; Smithrim & Upitis, 2005), and student voice (Gascoyne, 2017; Greene, 1995; Tyler & Likova, 2012). Children are able to see the direct impact of cause and effect through mark-making and are able to bring something into existence that was not there before (Eisner, 2005). Seeing the arts as a highly cognitive subject

can result in a pedagogical shift as it requires the placement of the teacher as not only a teacher but also a facilitator, and collaborative researcher with the students (Grano & Turunen, 2022; Kinney & Wharton, 2007).

Voice

Figure 12: Student Voice (Szekely, 2021, p. 33).

Greene (1995) best describes the dominant voice in education being "those of the officials who assume the objective worth of certain kinds of knowledge" (p. 9), resulting in the silencing of many student voices, especially those who are oppressed and marginalized. While guiding students, art offers them the opportunity of choice and initiation of engagement (Greene, 1995; Lewington et al., 2021). Art encourages self-expression (see Figure 12), allows students to make their thinking visible (Eisner, 2003; Eisner, 2005) in a way that is more accessible, and empowers the students to make a change (Gascoyne, 2017; Lewington et al., 2021; McArdle, 2008; Tyler & Likova, 2012). To embed art within daily learning removes some fragmentation of learning and allows students to really engage in the process of exploration and encourages teachers to better listen to each student, making the learning experience rich and powerful (Eisner, 2005; Gascoyne, 2017; Green, 1995). Moving art classes towards a student-centered

space allows students to truly share their learning, experiences, and "belief that they, too, can become agents of change" (Szekely, 2022, p. 9).

Choice

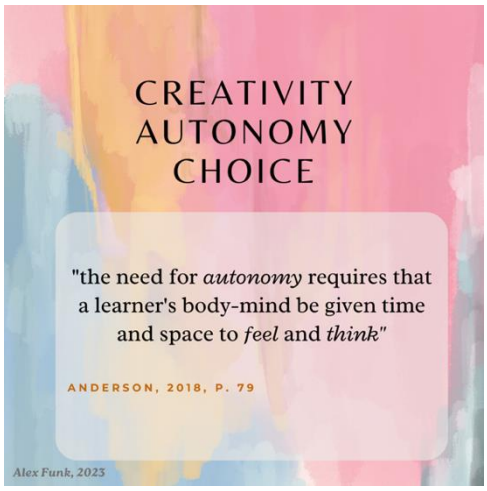

Figure 13: Creativity, autonomy, choice (Anderson, 2018, p. 79).

Through the efficiency model (Friesen & Jardine, 2009), student autonomy and choice were removed from many school subjects. This resulted in highly controlled art classes as well (Smith, 2014). Removing student choice means the stress system hijacks the brain and results in negative reactions rather than positive responses, as addressed in Figure 13, often looking like emotional outbursts or refusal to work (Borba, 2023). Eisner (2003) shares that "arts enable us to stop looking over our shoulder and to direct our attention inward…such a disposition is at the root of the development of individual autonomy" (p. 10), which echoes the research of Carlson and Zelazo (2023), showing that giving choice and autonomy promotes positive responses rather than negative reactions, as presented in Figure 14.

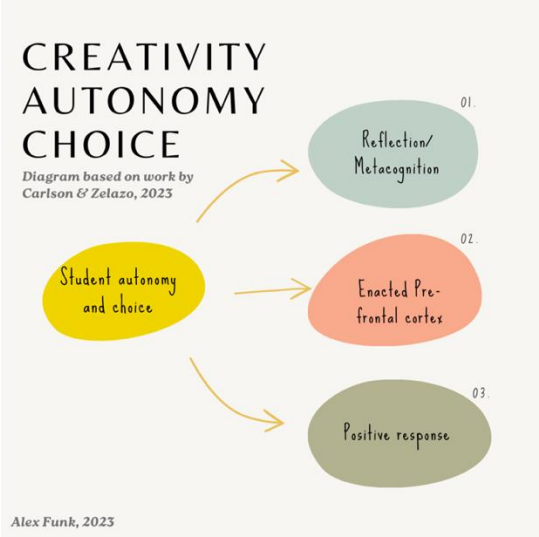

Figure 14: Breakdown of student autonomy and choice based on work by Carlson and Zelazo (2023).

Just as discussed in environment, classroom norms aid in building a community that has autonomy and personal initiative (Eisner, 2003). Giving students choice does not only happen during an art lesson but must also be given in response to a student's product. Adult artists choose when they feel their artwork is complete, and we must give our students the same respect (Eisner, 2003). Again, educators can only influence what students learn, however if no choice is given, it is less likely that learning will occur as the stress system will hijack the pre-frontal cortex (Anderson, 2018; Carlson & Zelazo, 2023; Zelazo et al., 2016).

Conclusion

As educators, every day in our classrooms is an experience that students learn from, whether positive or negative, and whether we plan it or not. Art is a highly cognitive subject that builds a variety of neural structures in the brain, yet when we approach the subject without intention or understanding, we can easily ruin the art experience for our students (Szekely, 2021). Over the course of this project, I have talked to teachers inside and outside of my building about their fears when it comes to teaching art, and within those conversations many admitted to

being afraid to let the students make any choices, while others were unsure what skills students needed to learn in art. It is an intricate balance to teach a skill while providing choice and autonomy. Through reflection on my own teaching and continued research, I have found much of that balance comes in letting go of a set product. Although I often have an idea for a project or how a project *might* look, I have realized it is in explaining to the students what the goal is and allowing them to explore that goal. At the beginning, it is encouraging students to share when they feel it is done, later on it is further questioning and asking them what makes it done, how they know what that feels like, and how they know they've achieved the goal (Erdt, 1954/62; Szekely, 2021). The process of art can be difficult, problems arise that do not have simple answers and are up to the individual to struggle with and solve (Eisner, 2003), it provides moments of quiet and reflection (Tyler & Likova, 2012), and when provided with choice and autonomy, it can be highly regulating (Beaty et al., 2016), all of which are EF processes. All research seems to point to the fact that without trying, art develops EF networks. I originally wanted to add to lessons ways to build specific EF networks, yet I realized that the development of those networks is naturally built into art. I also realized that teachers didn't know where to go to learn more information about building their art class. There are many amazing art teachers who have websites with art projects, yet it is difficult to find anything that goes deeper, engaging teachers in the process to create positive art experiences to enhance student learning. All of this ultimately led to the development of the website Art in Action (as a professional learning source. Continuing on from this project, I hope to continue my own learning and adding resources and information to this website in a digestible way to educators.

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Appendix A: Lesson Guides

ART LESSON PLAN

CIRCLE YOUR LESSON FOCUS

Focus	Element of Art	Material
	Artist Study	Concept/Topic

Purpose	Write lesson purpose:
Choice	Write areas for autonomy and student choice
Success	Ways to promote success
Reflect	Ways to promote metacognition

Alex Funk, 2023

ART LESSON PLAN

CIRCLE YOUR LESSON FOCUS

Focus	Element of Art	Material
	Artist Study	Concept/Topic

Purpose	Write lesson purpose: Take your focus and narrow it down here to write the element you choose to focus on, the material to look at, the artist (and their work) you are going to explore, or the concept/topic you want to look at.

Choice	Write areas for autonomy and student choice At what point will students have choice? Write the ways or areas you may need to let go of to promote and allow student choice during this project.

Success	Ways to promote success Write down possible questions you can ask students to promote thinking and engagement, write down the ways you can celebrate students in their process and work, or write ways to scaffold the task to promote success.

Reflect	Ways to promote metacognition Write the points you want to engage students in reflection throughout the art lesson. How can students reflect or think metacognitively when the lesson is introduced, while they are working, and when they feel they have completed their work.

CONCEPT LESSON

Topic/ Concept	What is the material focus of this lesson?
Materials Needed	What materials will the students need?
Format	What will the process look like? What is the 'end result' of the project?
Student Choice	Where will students get to add their own flair?
Reflect	What questions can I ask during and after the lesson?

Alex Funk, 2023

ELEMENTS LESSON

CIRCLE YOUR LESSON FOCUS

Element	Colour	Space	Value	Texture
	Form	Line	Shape	

Project	What are the kids creating? Where is choice built in?
Artists	What artists and their work are you using for inspiration & discussion?
Format	How are students engaging with the artwork/lesson?
Reflect	Ways to promote metacognition:

Alex Funk, 2023

MATERIALS LESSON

Material	What is the material focus of this lesson?
Materials Needed	What materials will the students need?
Techniques	What techniques will we explore? What do I need to learn/do?
Format	How are students engaging with the artwork/lesson?
Reflect	What questions can I ask during and after the lesson?

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Appendix B: Example Lessons Focusing on a Singular Concept or Topic

CONCEPT/ TOPIC

EXAMPLE LESSON

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HOW TO CHOOSE?

Time of year (seasonal)

Consider the weather, common imagery, student requests

This is a mix of elements, materials, and artists

PROJECT: LAYERED WINTER ART

CONCEPT	MATERIALS	EXAMPLES	PURPOSE
Multi-layered winter scene art	-acetate paper -picture frame -acrylic paint -sharpies	-of layered glass art -brainstorm ideas (window, snow globe)	Create a wintery layered art scene

FOLLOWING THE STUDENTS LEAD

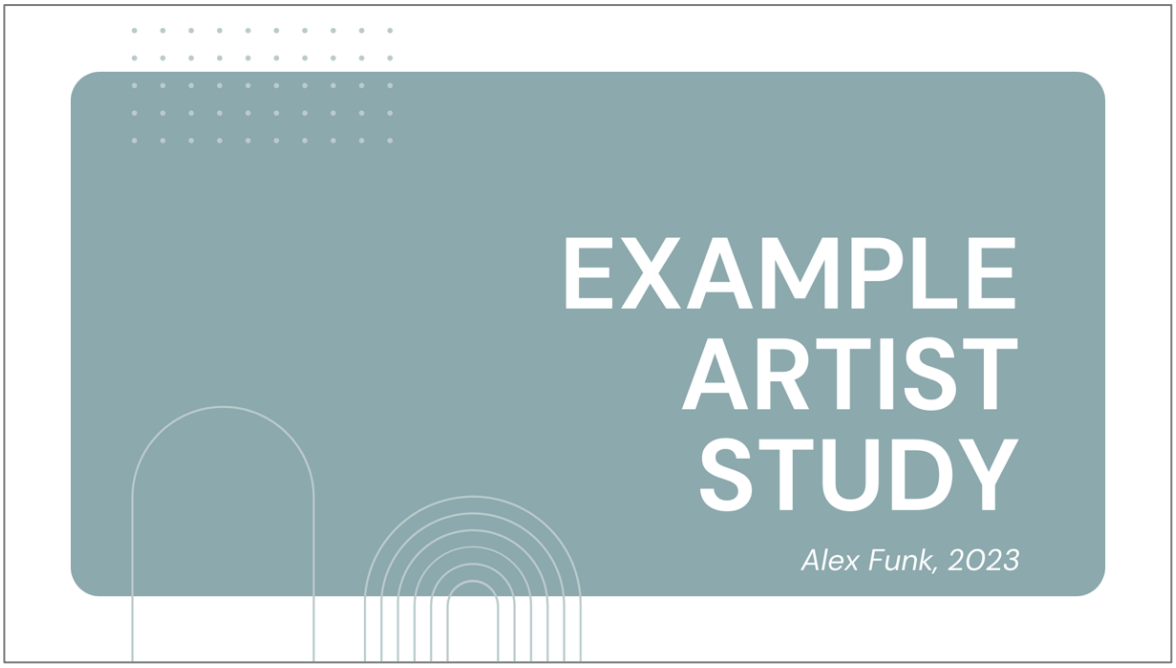


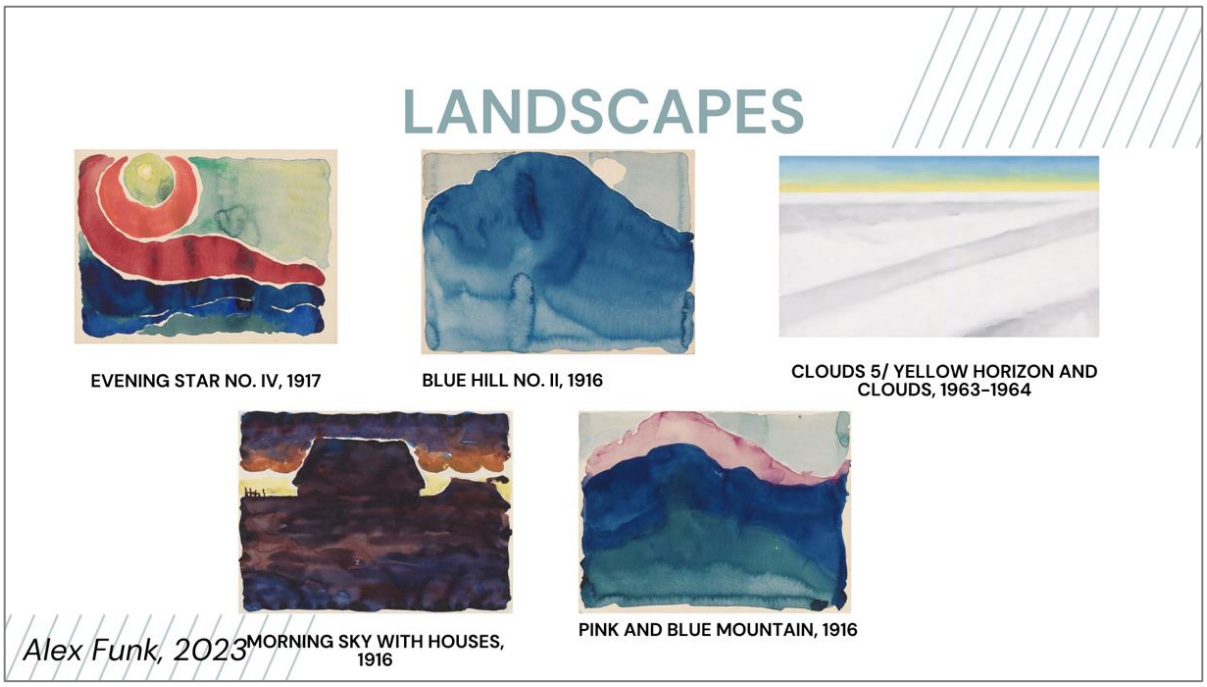




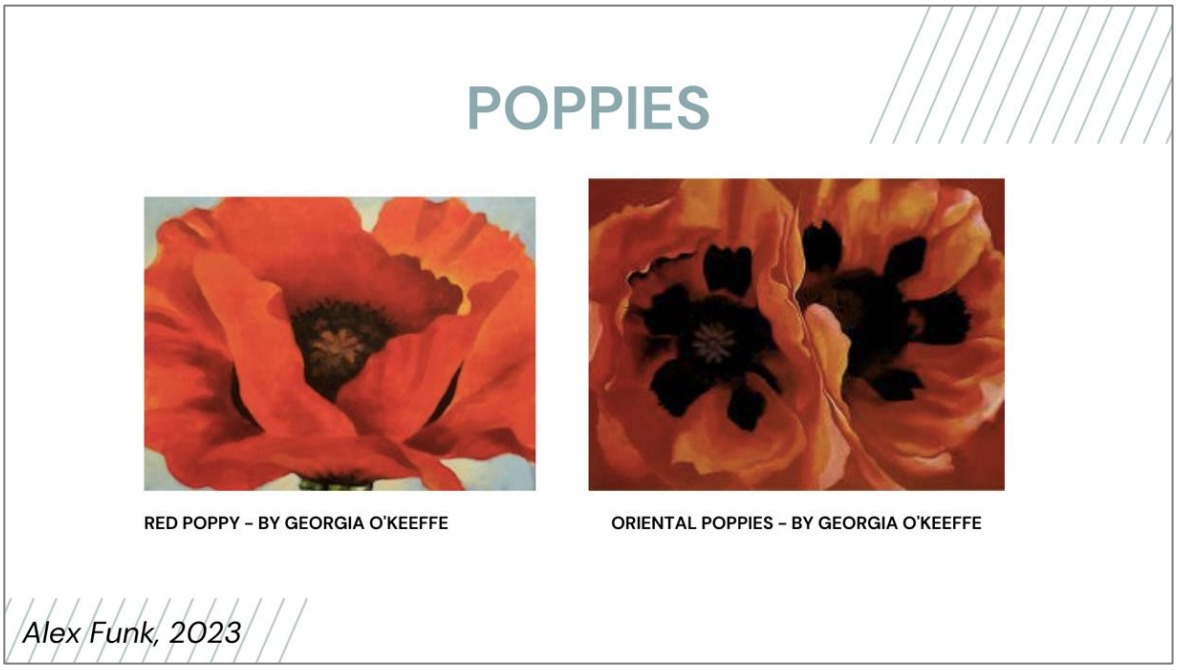


Appendix C: Example Artist Study Lesson

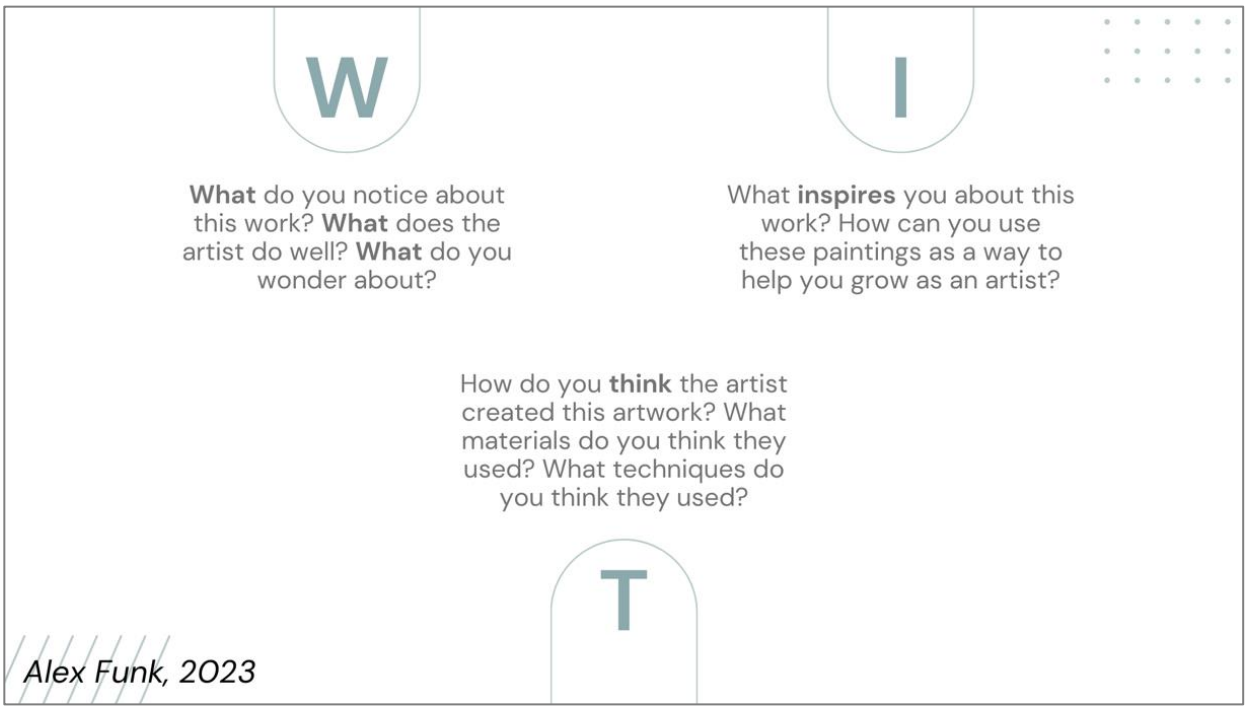


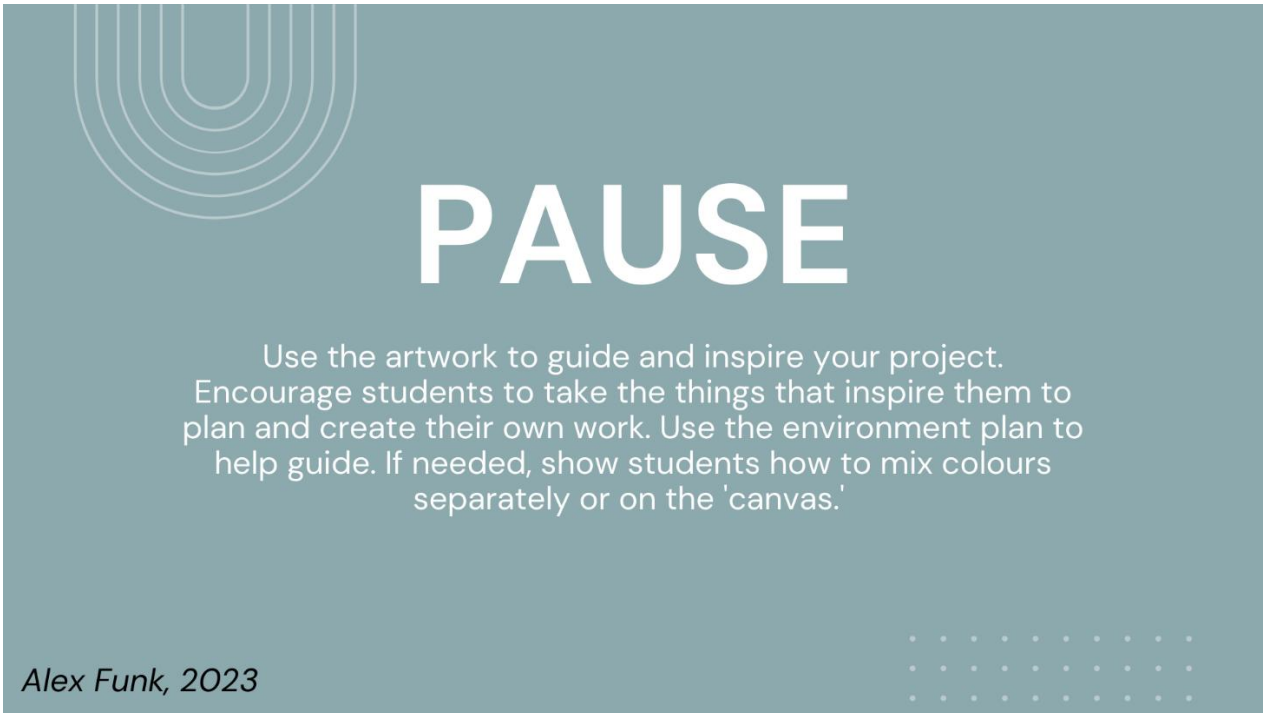


O'Keeffe, G. (1917). *Evening star no. III.* Watercolor mounted on board.
O'Keeffe, G. (1916). *Blue hill no. 2.* Watercolor on paper.
O'Keeffe, G. (1964). *Clouds 5/Yellow horizon and clouds.* Oil on canvas.
O'Keeffe, G (1916). *Morning sky with houses.* Watercolor and graphite on paper.
O'Keeffe, G (1916). *Pink and blue mountains.* Watercolor on paper.



O'Keeffe, G. (1927). *Red poppy*. Oil on canvas.
O'Keeffe, G. (1928). *Oriental poppies.* Oil on canvas.


W
What do you notice about this work? What does the artist do well? What do you wonder about?
I
What inspires you about this work? How can you use these paintings as a way to help you grow as an artist?
How do you think the artist created this artwork? What materials do you think they used? What techniques do you think they used?
T
Alex Funk, 2023


PAUSE
Use the artwork to guide and inspire your project. Encourage students to take the things that inspire them to plan and create their own work. Use the environment plan to help guide. If needed, show students how to mix colours separately or on the 'canvas.'
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IN MY OWN CLASS

I love doing some form of these giant poppies in my classroom. I originally saw an art teacher do a small version and I decided to go large (since Georgia O'Keeffe painted quite large). There is some guidance with larger strokes, adding oranges and yellows, otherwise students chose colours and petal shapes on their own.

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Appendix D: Example Material Study Lesson

EXAMPLE LESSON

MATERIAL STUDY

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WHAT MATERIALS?

IN MOST ELEMENTARY ART ROOMS:

- tempera paint
- acrylic paint
- watercolour paint
- tempera pucks
- oil pastels
- chalk pastels
- plasticine
- charcoal
- cardstock
- construction paper

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WATERCOLOUR
WHAT IS IT?
ALEX FUNK, 2023


WATERCOLOUR
WHAT IS IT?
Colour or pigment that is in a water-based solution.
To activate, you add water to it.
ALEX FUNK, 2023

WHAT YOU NEED

- A brush
- A cup of water
- A watercolour palette
- Watercolour paper
- crayons/oil pastels

ALEX FUNK, 2023

TECHNIQUES

WET ON WET	Wet the paper with water before painting with watercolour on it
WITH SALT	Put down a base of watercolour and sprinkle with salt
SPLATTER	Add colour to your brush and tap the brush over the paper to create a splatter
RESIST	Draw with crayon or oil pastel and then paint over with watercolour

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Includes link to youtube video: https://www.youtube.com/watch?v=-vhBPhw4PVs&pp=ygUad2V0IG9uIHdldCB3YXRlcmNvbG9yIGtpZHM%3D

Includes link to youtube video: https://youtu.be/YS8RdxQrw4c

Includes link to youtube video: https://youtu.be/0gVU8m9IeyM

Includes link to youtube video: https://youtu.be/u4AfLDMKBs8


Once you've shown the techniques, let the kids explore
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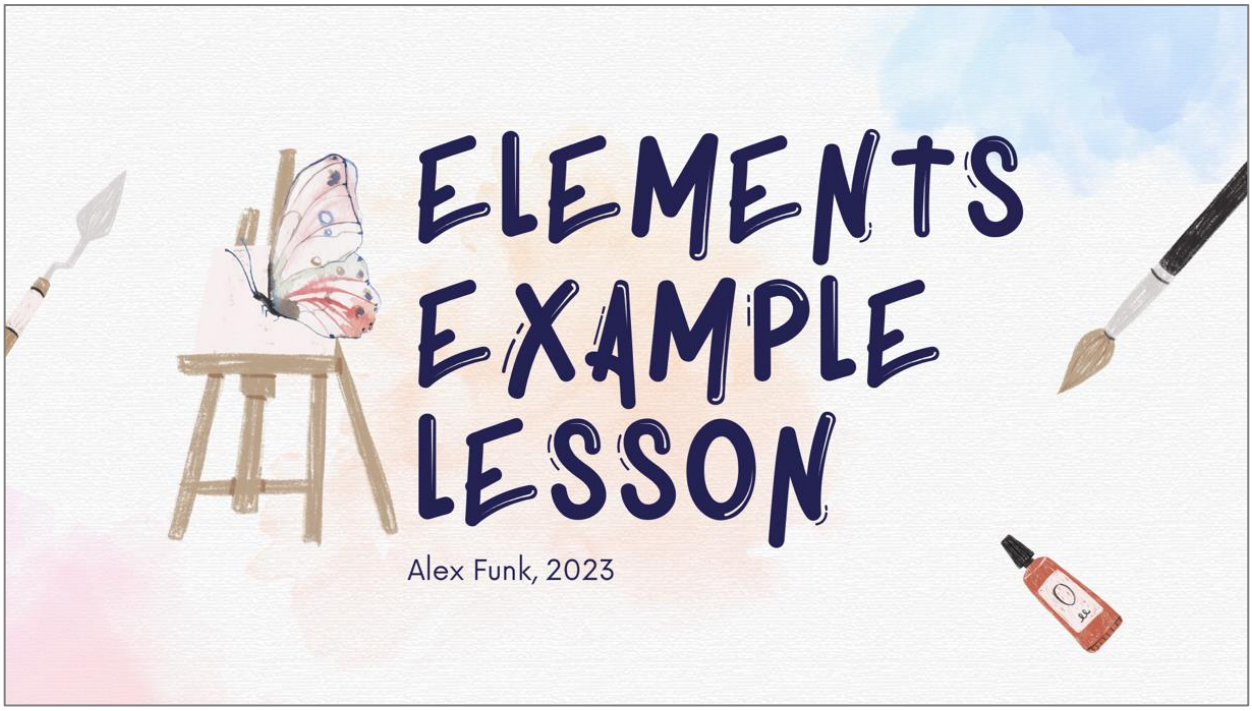
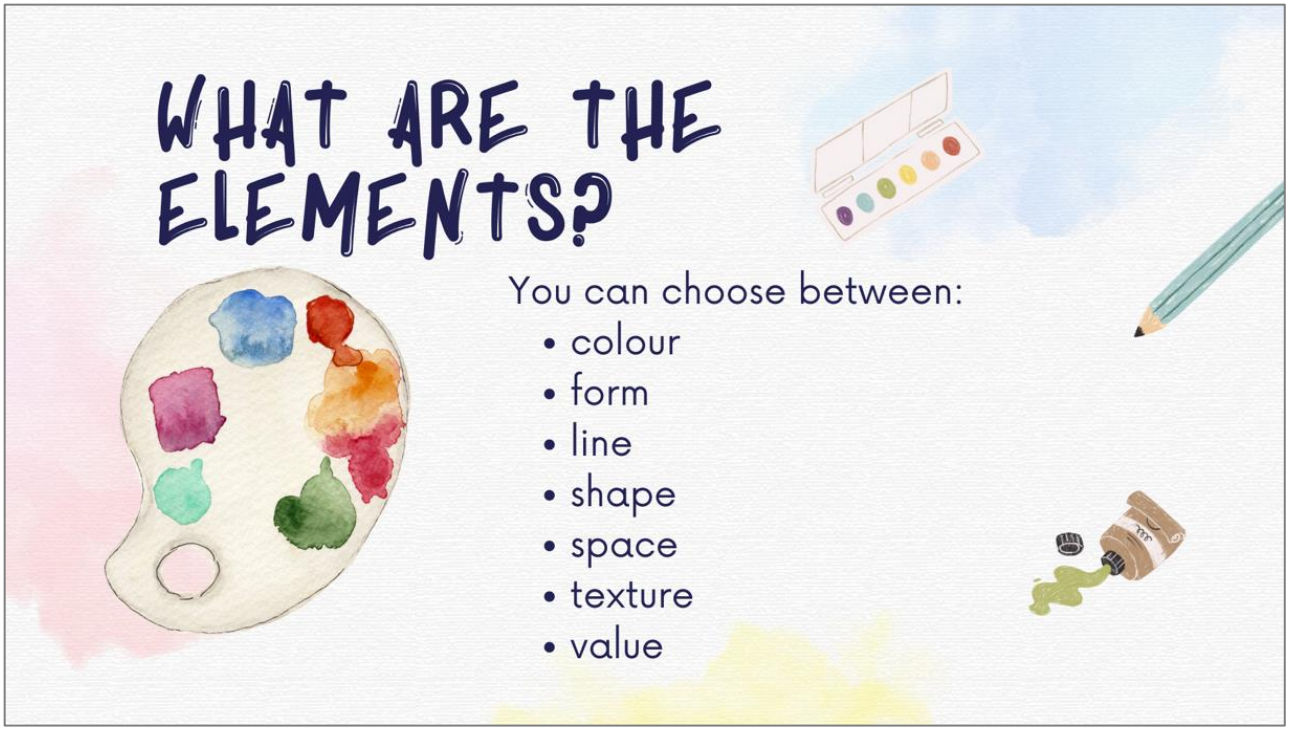
FOLLOW UP
QUESTIONS TO ASK
1
WHICH ONE DID YOU LIKE BEST?
2
IN A FUTURE PROJECT, WHICH WOULD YOU LIKE TO USE AGAIN?
3
WHAT ARE SOME PROJECTS OUR CLASS CAN DO USING THESE TECHNIQUES?
4
WHAT QUESTIONS DO YOU STILL HAVE?
ALEX FUNK, 2023

Appendix E: Example Lesson on the Elements of Art

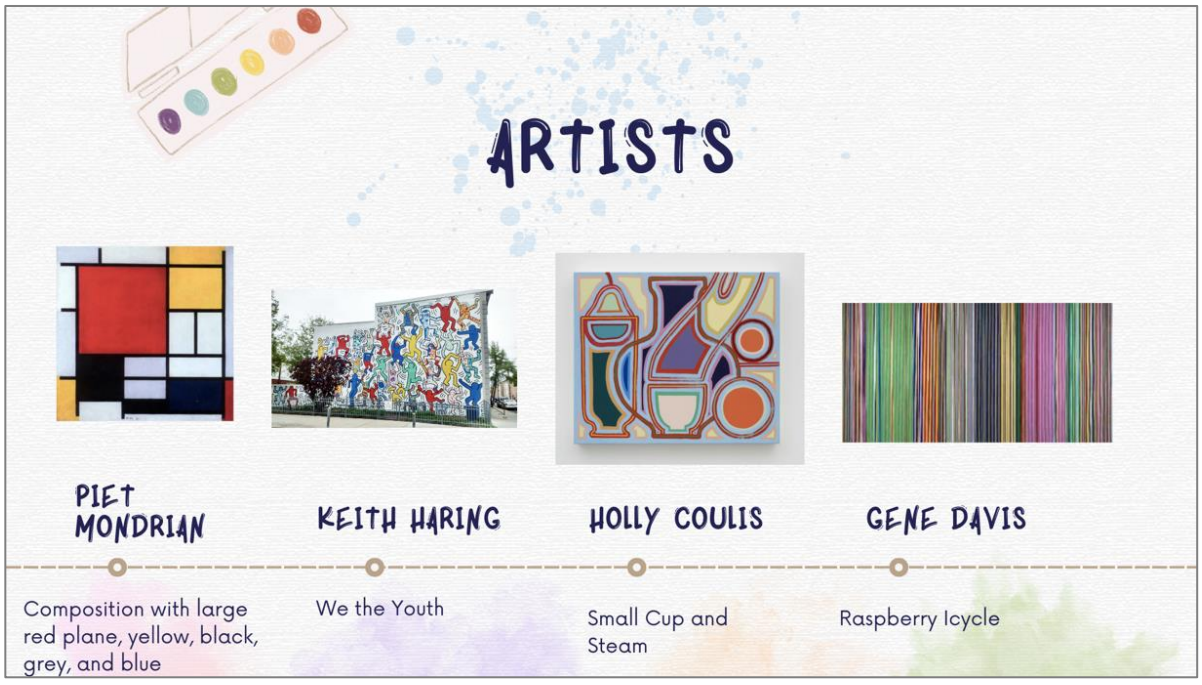


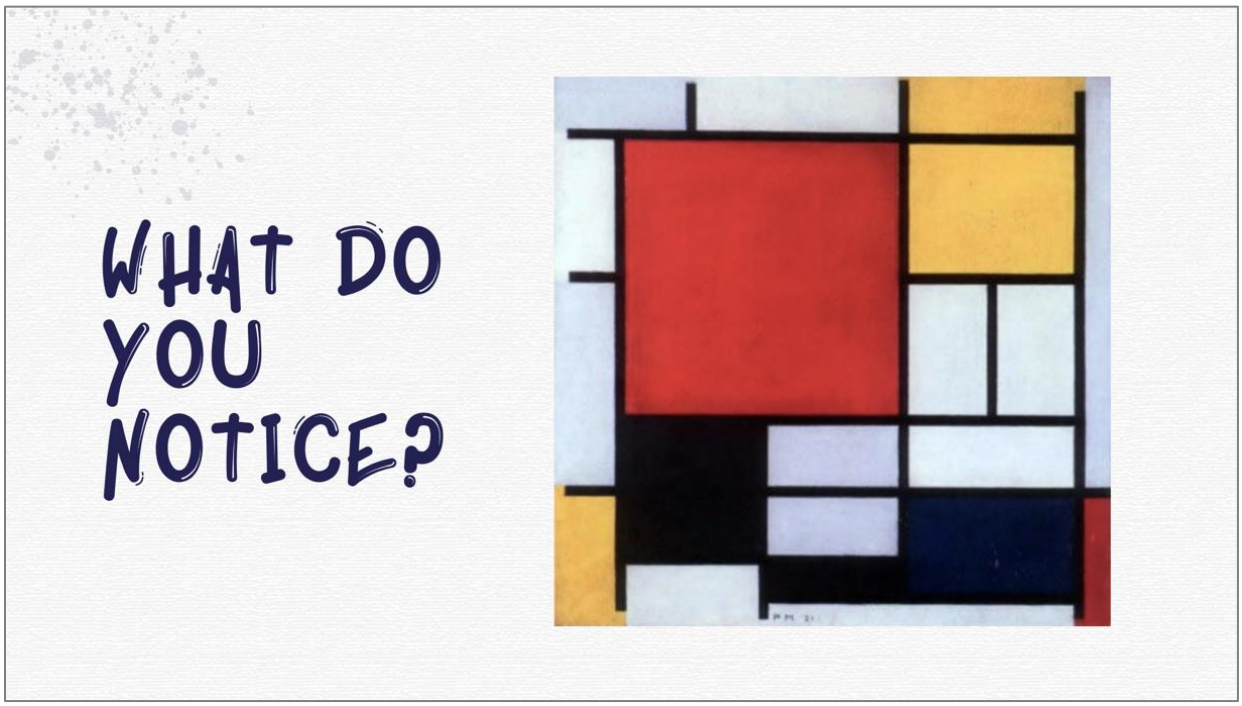



ELEMENT OF: Line
Alex Funk, 2023


LINE
WHAT IS A LINE?

Includes link to youtube video:
https://www.youtube.com/watch?v=BDePyEFT1gQ&embeds_referring_euri=https%3A%2F%2Fcdn.iframe.ly%2F&source_ve_path=OTY3MTQ&feature=emb_imp_woyt&ab_channel=KQEDArtSchool

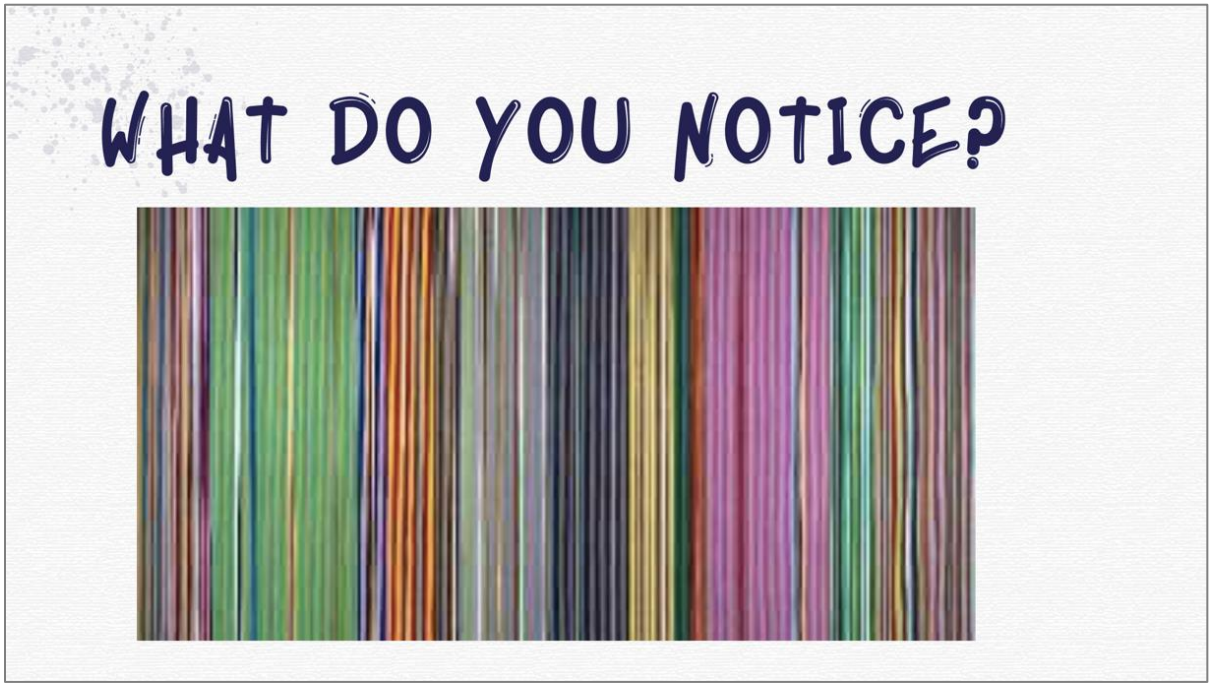




Mondrian, P. (1921). *Composition in red, yellow, blue and black.*

Haring, K. (1987). *We the youth.* Mural.

Coulis, H. (2019). *Small cup and steam.* Oil on linen.



Elements example lesson slide 10: What do you notice part 4.
Davis, G. (1967). *Raspberry Icicle.* Acrylic on canvas.