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Figure 5. *Libby's Life in Tree Rings*, Collage on Cloth (2014).

## A Systems View: The Role of Art in Education

A child mapped out her life on concentric rings of felt and paper. As she transcribed and placed her memories onto these expanding circles, she actively recalled her rapt encounter with a cross-section cut from a gigantic tree trunk and connected her life to that of the ancient redwood. The child was Libby and she created her life-map artwork in the 3rd grade.

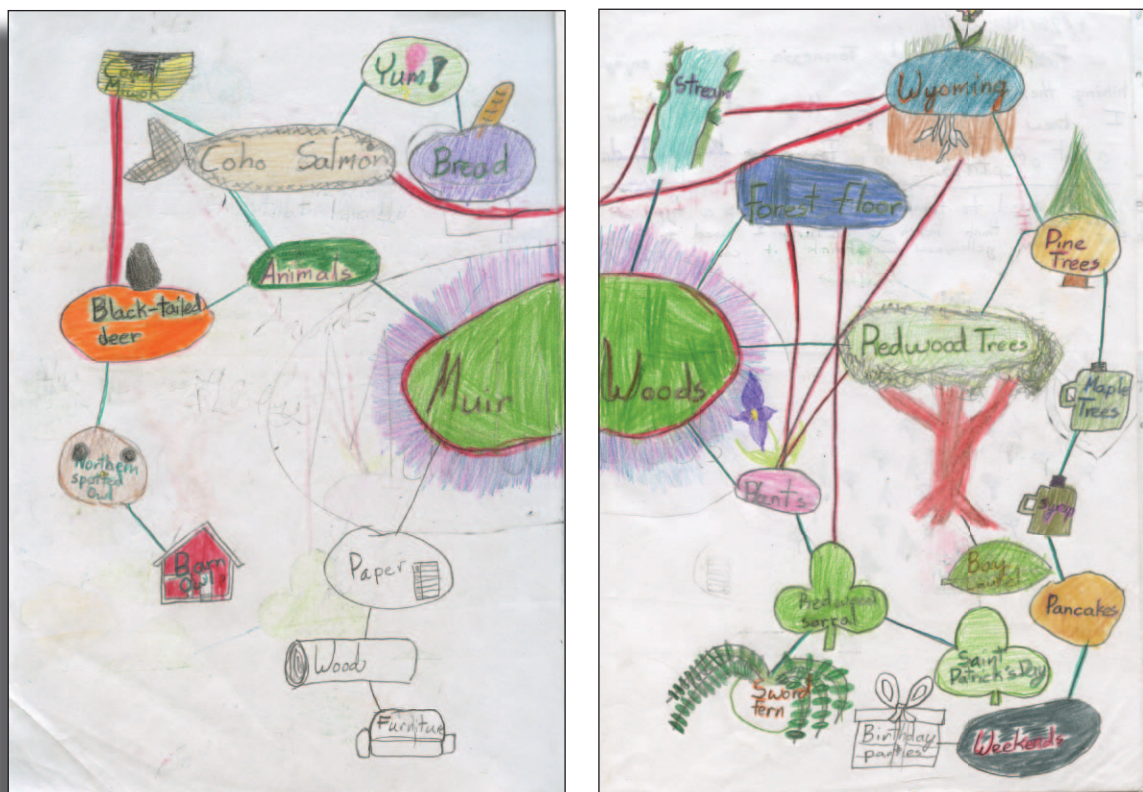


Figure 1. Libby's Concept Map. Two pages from her research workbook (2014).

Art educators and other leaders in the field often grapple with how art fits into education. What does Libby's experience tell us about how art practice and academic learning go hand in hand? This article examines these questions, looking first at art as inquiry in a 3rd-grade classroom and then at a model of arts-based research rooted in contemporary art. From there, it discusses art integration and suggests that a focus on research in contemporary art provides a basis for integrating art across the curriculum. Ultimately, it considers how art practice can and should be a core component of our general system of teaching and learning, arguing that a holistic, integrated view of art practice can be a firm foundation for art curriculum planning and for art advocacy in education.

### Art as Inquiry Across the Curriculum

Libby's artwork was the culmination of an extensive arts-based inquiry project at the Creative Arts Charter School in San Francisco, California, under the direction of art integration specialist Ann Ledo Lane and 3rd-grade teacher Katie Clay.<sup>1</sup> In this project, Ms. Clay's class visited Muir Woods, a national park in Marin County that is a monument to nature conservation pioneer John Muir. Muir Woods is a magical ecosystem full of giant redwood trees and all the flora and fauna that go with them.

Learners went to the woods as artist researchers using a scientific and historic lens. Prior to their investigation, they studied the ecology and history of the site in the classroom and this prepared them to do their individual explorations. For this inquiry,

each learner brought a research workbook. Far from being simple sketchbooks or journals, these books were field study books, the sort of books naturalists use in the field. They were also similar to books many contemporary artists use in or create as their artwork<sup>2</sup> and students in the International Baccalaureate Program use to document and reflect on their learning (International Baccalaureate Organization, 2007). In their field study books, Ms. Clay's 3rd-grade learners recorded their observations and experiences, and drew pictures of what they saw and thought about. They also made concept maps to diagram the phenomena they observed, the associations they made, and the ideas they generated. In these ways, they constructed, accumulated, and recorded their learning over time.

Libby was one of many 3rd graders to explore Muir Woods. Figure 1 is Libby's concept map of the woods and the associations she made with it. Notice that Libby's thinking moves from the flora and fauna of Muir Woods, to her associations with Wyoming, maple syrup, weekends, birthdays, and pancakes. Libby's mind wanders and as it does, she connects her life to what she sees in the forest and that gives deeper meaning to her woodland experience. A witty, colorful, and aesthetic image, this map also has a practical function: to make Libby's mental wandering and her abundant associations visible.

Figure 2 shows a couple of pages from Libby's research workbook featuring her illustrations of the animals and plants she saw on the field trip or studied in class. Here we see how in field study

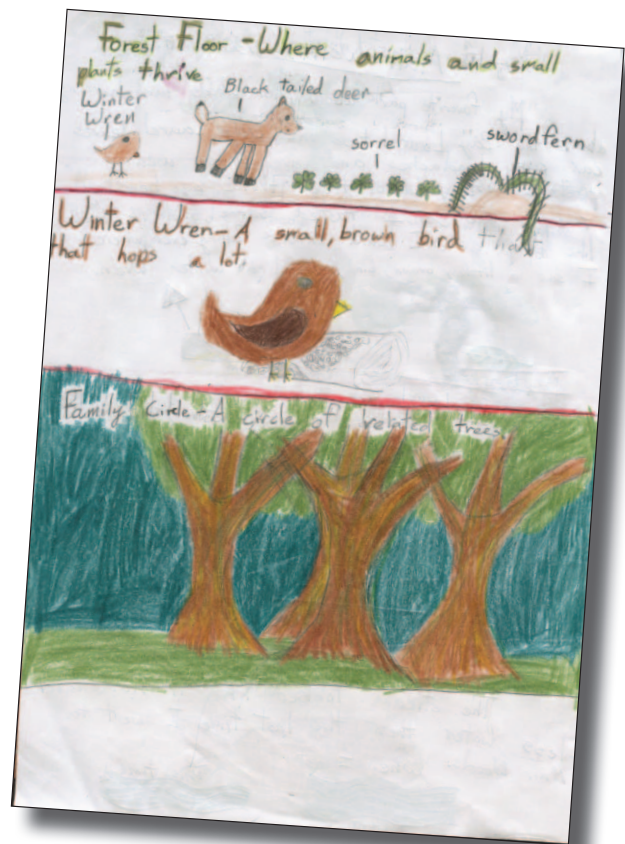
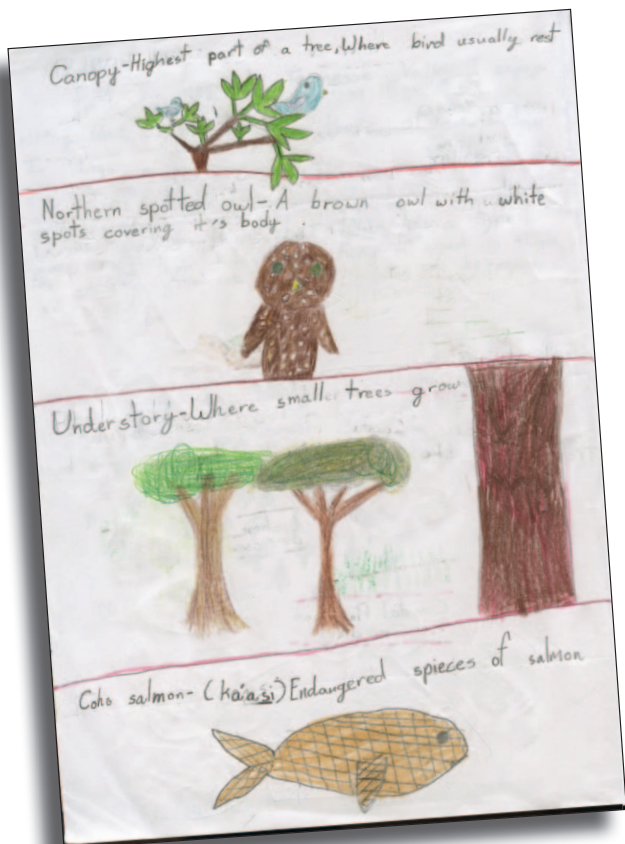


Figure 2. Libby's Record of Observations. Two pages from her research workbook (2014).

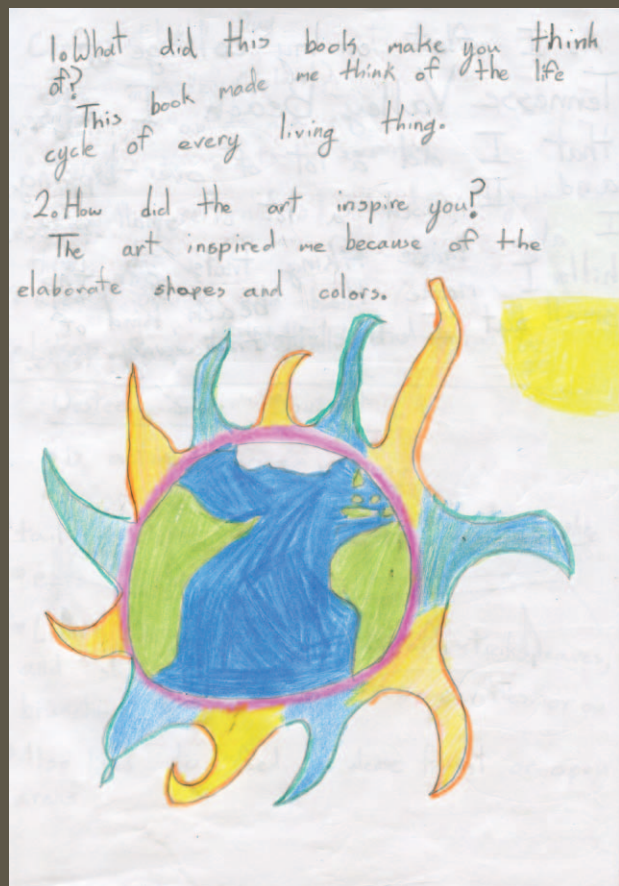
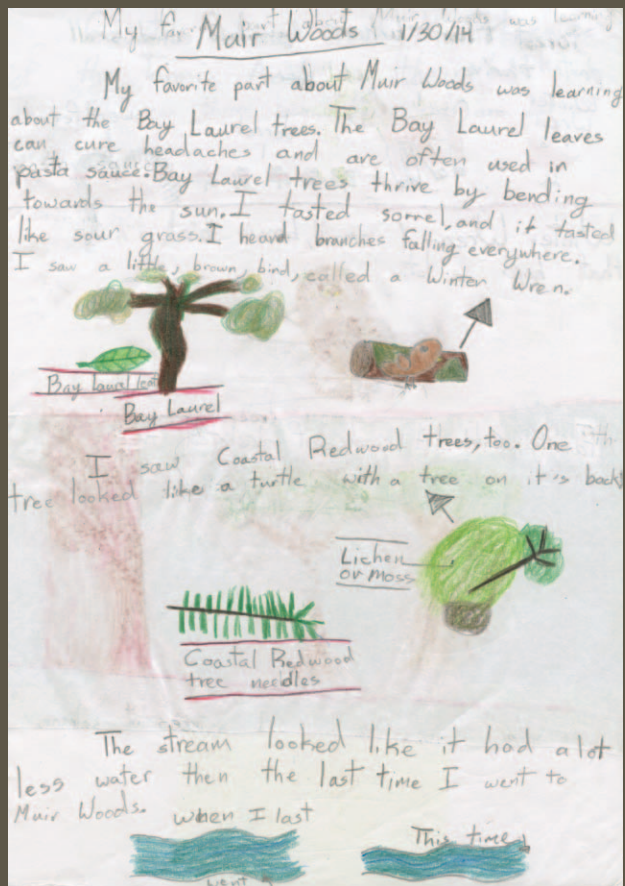


Figure 3. Libby's Reflections. Two pages from her research workbook (2014).

books visual imagery is juxtaposed with written explanations and observations. Visual imagery is important to scientific as well as artistic inquiry and, therefore, is a prominent part of research workbooks.

The research workbook is also a site for reflection. In page one of Figure 3, Libby's prose became poetic. In expressive language, she recounted the multisensory experiences she had in the woods and recorded her impressions. In page two of Figure 3, Libby reflected on making her book and answered two questions posed by her teacher. To question one, "What did this book make you think of?" Libby answered, "The book made me think of the life cycle of every little thing" (personal communication, 2014). Libby's insight here shows how deeply she thinks and how she is able to discern patterns underlying phenomena. In her answer, we also see how a research workbook can elicit a learner's understandings.

In answer to the second question, "How did the art inspire you?" Libby replied, "The art inspired me because of the elaborate shapes and colors" (personal communication, 2014). Whether she was referring to the shapes and colors of the forest or the ones she used in her artwork, Libby's answer highlights the capacity of visual imagery and expression to engage a young person in an investigation and learning, a primary reason for doing arts-based inquiry into academic subjects.

Figures 4 and 5 show two parts involved in making the tree map, the final activity in the project. Figure 4 is a list of significant

## Metaphorical thinking transformed Libby's learning into meaning-making by connecting academic study to herself and placing her in the greater age-old ecosystem she inhabits.

happenings in Libby's eight years of life, one for each year, which Libby made to prepare for her tree ring collage. As another step in the process of connecting her life to the forest that begun with her concept map of the woods (Figure 1), Libby's list illustrates how background knowledge and thinking skills acquired from prior investigation and analysis provided a foundation for the metaphorical leap Libby took when she mapped her life in tree rings.

Figure 5 (page 12) shows Libby's tree ring collage. Because a historic tree trunk carries a lot of meaning, the cross-section worked well for inspiring Libby's connective thinking. The rings make

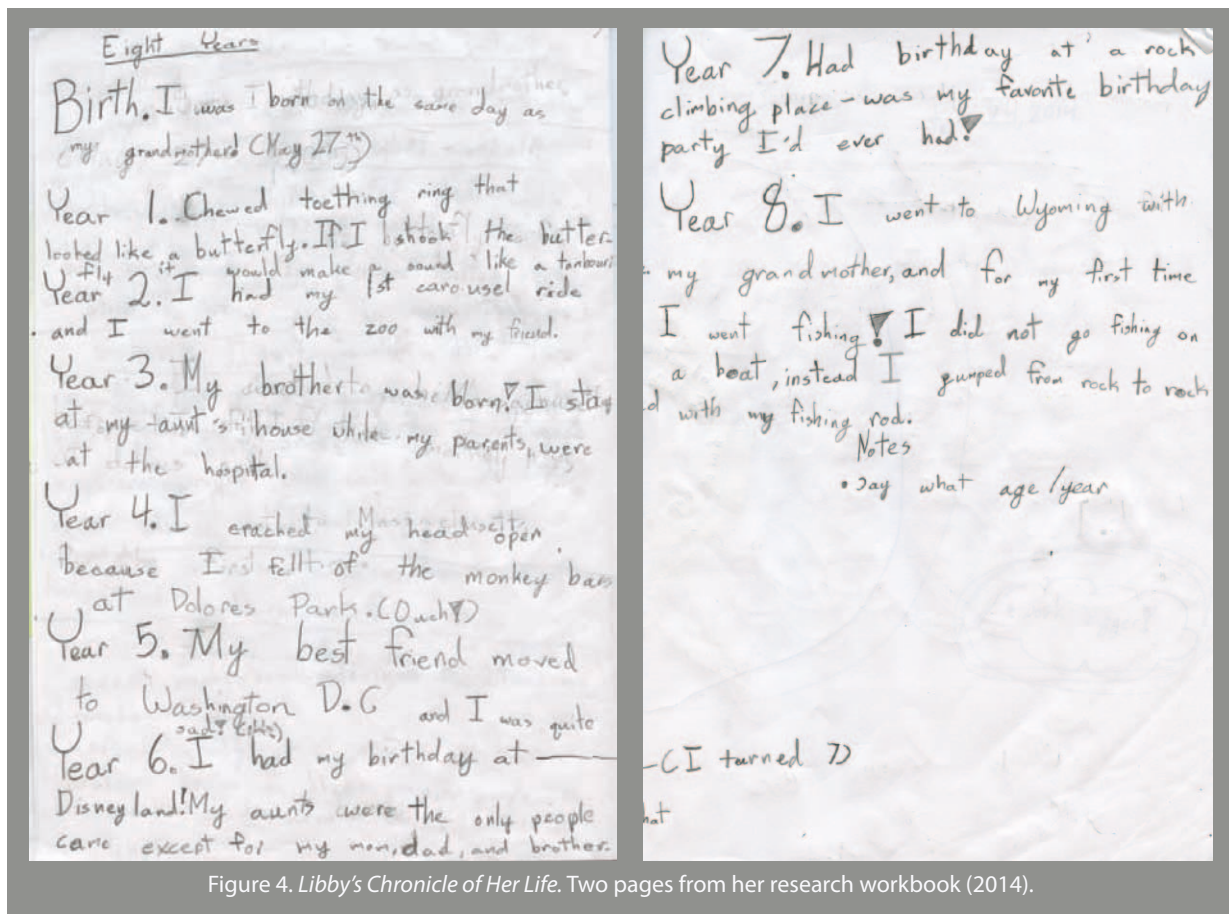


Figure 4. Libby's Chronicle of Her Life. Two pages from her research workbook (2014).

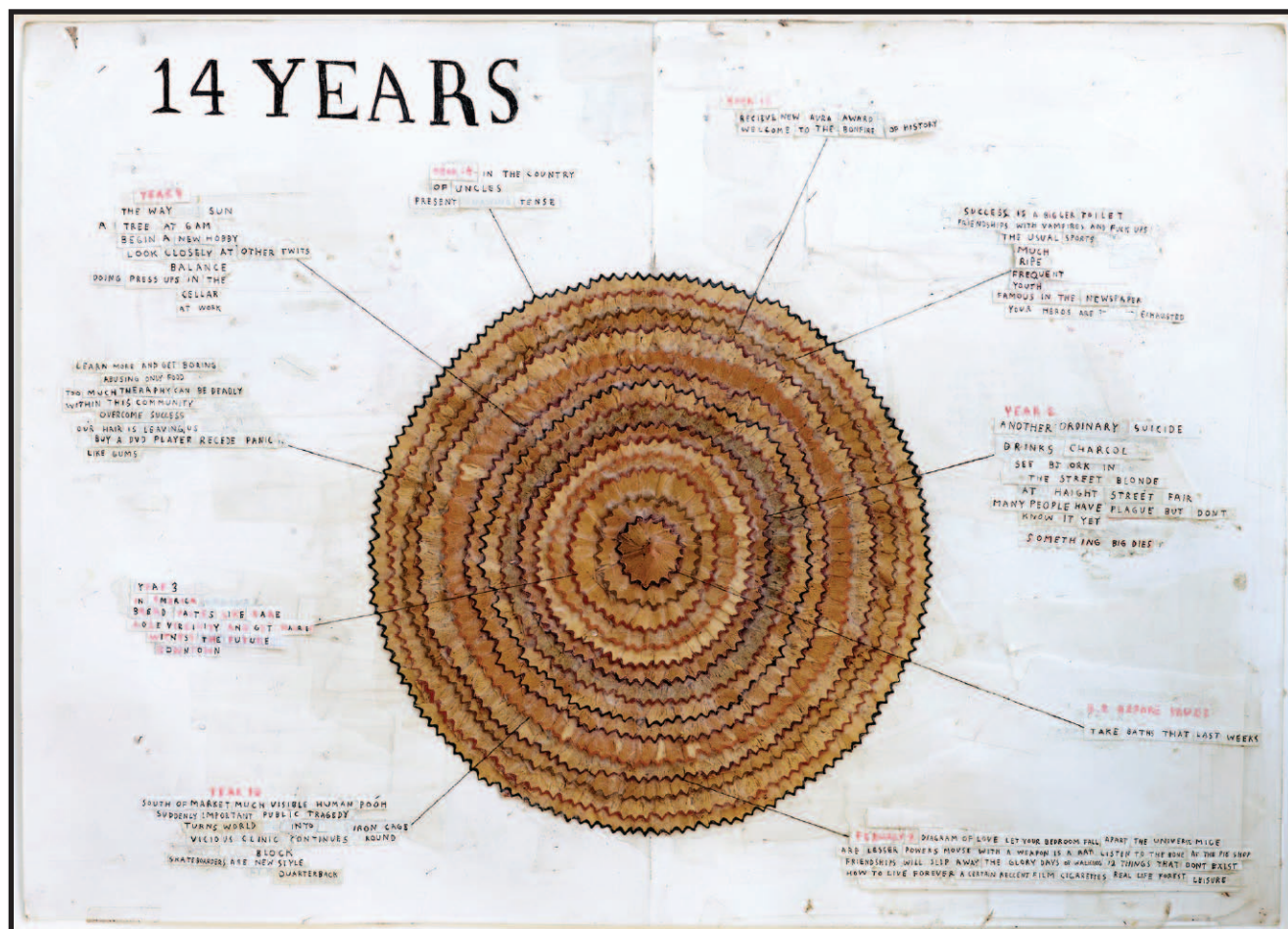


Figure 6. Simon Evans, *14 Years* (2005). Courtesy James Cohan, New York. Photo by Marion Brenner.

growth and the passage of time visible, thus supplying a format for mapping time, and providing a metaphor for life and growth over time. Engaging in that metaphor not only gave Libby a map and a metaphor for understanding how she is growing over time; it also helped her to see how relatively short a human life span is in comparison to that of an ancient plant. This is where metaphorical thinking transformed Libby's learning into meaning-making by connecting academic study to her self and placing her in the greater age-old ecosystem she inhabits.

Metaphor is one of art's time-honored tools for making meaning and transforming perceptions, and contemporary artists use it to great effect (Marshall, 2014a). For example, Simon Evans tapped into the tree metaphor to map out 14 years of his life (Figure 6). His tree ring map provided the art example that inspired Libby and her classmates when they created their own artwork.

The Muir Woods Project represents a particular model of art integration quite different from the common approach we see in many guides to arts integration (Donohue & Pascale, 2012; Goldberg, 2012). This model is distinctive because it is based in inquiry. Indeed, art integration here is an **outcome** of arts-based inquiry; integration occurs as a learner pursues an inquiry into a topic.

An emphasis on inquiry represents a shift in art integration because when art integration happens through inquiry, students do not simply represent academic content using art methods and materials; they connect their topic to big ideas, and they do it through an art practice that involves methods, tools, and thinking from various disciplines—such as observation, critical analysis, synthesis, questioning, connecting, and reflection (Marshall & Donahue, 2014). Integration here works on a procedural level (methods and thinking) and on a conceptual level (linking to ideas and concepts). Moreover, in an art integration based on inquiry, learners explore content and connections through an organic, yet intentional, process that welcomes improvisation and invention (Marshall, 2014b). Libby and her classmates had license to improvise and play, and to see information and ideas in a new light. In this model, learning is multidimensional, substantive, and creative.

### Arts-Based Research in Contemporary Art

The Muir Woods Project is an example of arts-based pedagogy, but how does it fit with what the art world considers to be art? Could art integration be regarded as genuine art practice? Behind these questions lies the issue of whether art must be taught as a discrete discipline to remain authentic or if it can be applied across

the curriculum and still be considered art. This is an important issue because it has implications for how art educators conceive art and teach it, and also how art is embraced by the educational system. The answer lies in contemporary art.

Contemporary art comprises a broad array of art practices, styles, and genres (Wilson, 2013). Among this variety of practices and genres stands research-based art, a kind of art in which issues and topics are investigated through an art lens and interpreted through artmaking (Malina, 2013). The term “research-based art” could imply that an artwork merely begins with research. However, Sullivan (2005) argues that that is not the case; making art is a research process in itself and, therefore, research and learning extend throughout the entire process. Sullivan calls this arts-based research. Although arts-based research underlies all art production, it is especially evident in the research-based art we see emerging in the art world today.

There are many examples in contemporary art that demonstrate arts-based research in action and, therefore, provide art world models for art integration in the classroom. An exemplary one is the Crochet Coral Reef Project (Wertheim & Wertheim, 2015) (Figure 7); in this ongoing project, groups of artists from around the world study life in coral reefs and then take up their crochet hooks and craft fanciful corals and related life forms in myriads of colors, textures, and hyperbolic shapes. As they create, they discover how mathematics, living forms, and the act of looping and hooking thread are intimately connected.

Here research is not only a springboard for art production, but also occurs throughout the entire artmaking process. Research informs art production and art process propels further research and learning. This is truly arts-based research. We see this in how the artists apply the mathematical formulas they are studying to generate new understandings of hyperbolic form. And in how they

take it further to invent new forms. They experiment, improvise, and play with forms and patterns, producing multiple new variations on sea life based on mathematical blueprints. This generation of diverse invented textile forms creates a profound insight: art evolves organically over time in much the way life forms evolve. As the Wertheim sisters suggest, an insight such as this could only emerge from a hands-on creative process.

Understanding cross-disciplinary arts-based inquiry as both a way of learning and an art form enables us to reconcile arts integration with notions of art practice in the art world. There are two important benefits to this. First, art integration can be at home in both the art classroom and in general classrooms. Second, basing school art on contemporary art, which is endlessly seeking out new boundary-breaking forms and practices, opens up multiple possibilities for innovative integrated art curriculum.

### Art and Integrated Thinking

As we see in the Crochet Coral Reef Project and The Muir Woods Project, invention and insight go together and are two significant outcomes of arts-based inquiry. Both projects employ invention to go beyond the known to see knowledge differently and create something new. To do this, they engage in a distinctive kind of thought that mingles analytical, logical, and linear reasoning with nonlinear and associative thinking. This hybrid thinking is central to artmaking and it is also core to inquiry



Figure 7. *Irish Satellite Reef*, part of the Institute for Figuring's Crochet Coral Reef project (2005–present). Photo © the IFF.n

# Where does art integration fit into education? How should leaders articulate, situate, and promote art in the schools?

in all disciplines (Trueit, 2005). Trueit calls this thinking “poietic logic” and maintains that it is the engine behind all scientific breakthroughs, particularly those in the New Sciences of Chaos and Complexity, two fields that stem from systems theory. Identifying poietic logic as a core mode in all inquiry is critical to art integration because it reveals the deep conceptual connections between art and its sister disciplines. For art educators, it also justifies art practice, with its flights of association and fantasy generating new perspectives and knowledge, as a valid kind of inquiry with particular value to education (Marshall, 2014b).

Poietic logic is evident in Libby’s tree ring map and also in her concept map where we see her mind meandering from Muir Woods to pancakes. Poietic logic is also apparent in the Crochet Coral Reef Project where the sequencing and multiplication of crochet stitches were linked to growth in organisms, and the analogy between biodiversity and artistic diversity became apparent as more varied, complex, and inventive crochet sea creatures emerged.

Poietic logic exemplifies creative thinking, a valued skill in education today (Partnership for 21st Century Learning, 2015). Art’s poietic logic has another benefit for learners and for education: it can help students grasp how the parts of academia fit together and how the things they learn in school connect to them and their world. Because poietic logic enables learners to conceive of how they and the things around them fit into a larger system, it could lead to an understanding of systems, a cross-cutting concept in the Next Generation Science Standards (Achieve, 2013). In the New Sciences, poietic logic enabled scientists to discern the deep connections that underlie their findings and to understand the world systemically (Trueit, 2005). Art practice with its poietic logic stands to do a similar thing for young learners.

## Art Education and a Systems View of Education

Where does art integration fit into education? How should leaders articulate, situate, and promote art in the schools? We begin by looking at education as a system. According to Bertalanffy (1968) and Laszlo (1996), a system is an organized whole comprised of multiple interacting parts that work together toward a purpose. In living systems, this purpose is sustaining the system. Education, when viewed through this lens, is a living system of learning and teaching comprised of interacting sets of knowledge

and practice embodied in the various disciplines and pedagogies with the purpose to sustain itself and also to educate.

Systems theory also tells us that every part of a system must have a vital role in the life of the system. It follows that for art to truly be a valued component in the education system, it must be deemed important to the system’s purpose. In today’s educational climate, that purpose is often narrowly defined as “readiness for college and career,” while academic achievement is designated as the indicator of whether that goal is met. This concentration on academic success presents a challenge to arts education since many studies find arts learning *correlates* with high academic achievement, but very few find arts learning *causes* it (Fleming, 2012).

Art educators know that art is enormously valuable for many reasons beyond bolstering academic performance. Art education literature is filled with lists of the positive effects art learning has on learners’ cognitive, social, and emotional development (Fleming, 2012). Art has more often found its place in schools as a counterbalance to academic learning, or as a peripheral discipline considered to be significantly different from its academic counterparts. Both scenarios can lead to the marginalization of art, and, as we have seen in many California elementary schools, its elimination.

If art educators want to challenge this, they must demonstrate how art can be more central to a system dedicated to academic success. We must articulate how art practice is intellectual and conceptual, and, because of this, can enhance academic knowledge and build cognitive skills. This includes explaining how art overlaps with the academic disciplines in the thinking they have in common, the subject matter and cross-disciplinary ideas they all address, and the processes they share. It also means showing how art practice, when applied as inquiry across the curriculum, enhances, broadens, and deepens learning by allowing learners to explore knowledge, play with ideas and information, and make it their own.

## Concluding Thoughts

Applying art across the curriculum demonstrates how art can act as a glue to join the many components of the system together, and as a catalyst for stimulating learning and looking at knowledge differently. By doing both, art integration makes the system work better for our students. It brings color, texture, form, and meaning to learning; it brings imaginative logic and serious, deep thinking as well. Leaders in art education should take notice. When we design systems-savvy art curriculum and demonstrate to the system how critical art practice is to learners and to the system, art will thrive in schools. Whether looping and tying math to science and nature, or following an art research trail into the woods, artists-learners can show us how it is done. ■

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## Endnotes

- <sup>1</sup> This is an example from elementary school. The approach also works for middle and high school (Marshall, 2014b).
- <sup>2</sup> For examples of artist's journals or research workbooks see: New (2005). For classroom strategies for scaffolding arts-based inquiry, see D'Adamo (2015).

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