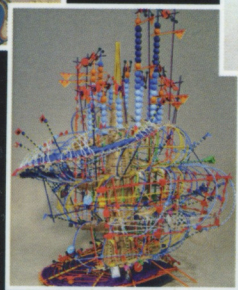


ART-CENTERED LEARNING ACROSS THE CURRICULUM

Integrating Contemporary Art in
the Secondary School Classroom



Julia Marshall and
David M. Donahue

Foreword by Lois Hetland



for weather phenomena jump off the page or the TV screen into three-dimensional space, inviting the viewer to wander into a playground of whimsical structures in which every line, every dot, and every arrow has symbolic meaning.

Integration (Purpose, Knowledge, Methods, and Forms). Regarding *knowledge*, Nathalie Miebach demonstrates how artists depict and transform content from science. In making information and relationships among bits of information visible, tactile, tangible, and aesthetic, she draws her audience in and opens them up to thinking about critical issues. For example, in *Changing Waters* (see Figure 3.5), she focuses on the effects of global warming on weather patterns. On the level of *methods*, Miebach reveals how artists use structures from nature to organize their artwork. She also shows how mapping—a method and a *form* taken from the sciences and social sciences—can be used as a device for making meaning in art. In her mapping, Miebach references symbolism and *forms* in scientific illustration (weather maps). Each element of the sculptures and musical notations stands for some element in the weather. She also incorporates standard symbols from weather maps, connecting her work closely to scientific imagery. The beauty of Miebach's work reminds us of how visually engaging many scientific formats, such as maps, charts, and graphs, can be. Certainly, Miebach taps into the aesthetics of science, particularly the conjunction of aesthetic beauty with clarity and conciseness in transmitting meaning. In this way, she indirectly addresses the *purposes* of scientific formats: to record, to inform, and to propel further understanding.

Creative Strategies. Miebach uses the creative strategy of *reformatting*; she takes the format of weather maps in two directions; she maps weather information in the form of musical notations, thus transforming it into music, and she also makes information three-dimensional, shaping it into installations composed of woven basket-like forms.

Biology and History: Interconnections

What happens to us physically and mentally when we experience a great personal loss? What mechanisms do we use to help us cope? These are questions Nene Humphrey raises in her works *Circling the Center* (2012) and *Community Braiding* (2010), Figures 3.8 and 3.9. Humphrey is a multimedia artist with an abiding interest in the physiology of the brain. As a resident artist at Joseph LeDoux's neuroscience laboratory at New York University, she explores, alongside a team of neuroscientists, the amygdala, the seat of emotions in the brain. Here she peers through a high-powered microscope to draw very detailed renderings of the millions of intertwining neurons that make up this part of the body.

While she uses the tools and methods of neuroscientists, Humphrey approaches her research as an artist; she explores human experience, in particular how bodily structures respond to and affect human feelings and behavior. The

Figure 3.8. Nene Humphrey, *Circling the Center*, 2012.



Image courtesy of the artist and Lesley Heller Workspace, New York City.

Figure 3.9. Nene Humphrey, *Community Braiding*, 2010.

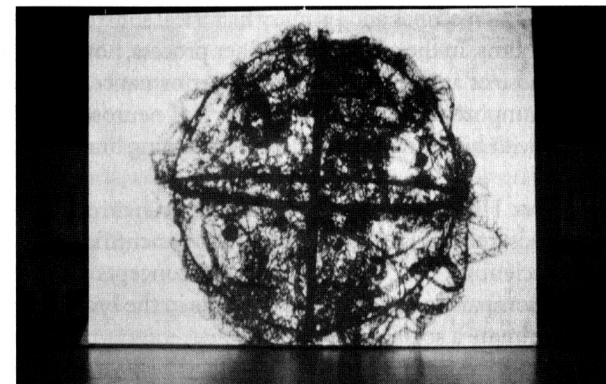


Image courtesy of the artist and Lesley Heller Workspace, New York City.

connections she draws in *Circling the Center* are between the neurological webs in the part of the brain that deals with sorrow and the intricate webbed braids mourners plaited in Victorian England to help them cope with their grief. The physical resemblance between the two webs immediately ties them together. Humphrey's work, however, makes deeper, metaphorical connections between the electrical impulses that ignite the neurons in the amygdala and the spirit that ignites a sense of community among braiding mourners. To convey this connection, performers make braids while animated images of magnetic resonance imaging (MRI) images, electronic circuitry, and Victorian mourning braids play on a screen, and tapes of serenading lab rats, ticking metronomes, and chanted braiding instructions

permeate the air. With this weaving of sound, movement, and imagery, the work becomes a meditation on patterns—patterns in our bodies and patterns in our emotional and social lives.

This work is also a meditation on survival. Because the amygdala processes emotions such as grief and fear, it enables us to survive. The same is true of the personal and cultural rituals we perform around loss and grief. By integrating the physiological with the cultural, Humphrey makes these poetic connections, which are the hallmark of art (Sleigh, 2013).

Integration (Purpose, Knowledge, Methods, and Forms). Because she is so intimately involved with scientific research and knowledge, Humphrey's work alludes to the *purpose* of science: to find and explain physical phenomena. More importantly, her work exemplifies the core purpose of art: to find meaning in the knowledge we gather from science. Regarding *knowledge*, Humphrey plays with the knowledge of neuroscience and cultural history and, in so doing, generates knowledge about how humans function physically, emotionally, and socially. Regarding *methods*, in the first stages of her work, Humphrey mimics the methods of neuroscience and history, using tools from both (microscopes and primary historical sources) and doing copious research in both realms. In the greater part of her process, however, Humphrey's methods are purely those of art: weaving, braiding, performance, video, and sound. In regard to *forms*, Humphrey combines the imagery of neuroscience (MRIs) and the sounds of the lab with historical forms such as mourning braids.

Creative Strategies. Humphrey *mimics* researchers in neuroscience and history, using their methods and tools. She also *juxtaposes* scientific imagery with art imagery to connect scientific concepts with cultural concepts. Furthermore, she makes an *analogy* by comparing the electrical currents in the brain to the interpersonal currents that animate a social group.

REFERENCES

- Aicken, F. (1991). *The nature of science*. Portsmouth, NH: Heinemann.
- Baggott, J. (2012). *Higgs: The invention and discovery of the God particle*. Oxford, England: Oxford University Press.
- Ben-Ari, M. (2005). *Just a theory: Exploring the nature of science*. Amherst, NY: Prometheus Books.
- Beveridge, W. (1950/2004). *The art of scientific investigation*. New York, NY: Norton.
- Bohm, D. (1998). *On creativity*. New York, NY: Routledge.
- Cropley, A. (1992). *More ways than one: Fostering creativity in the classroom*. Norwood, NJ: Ablex.
- Derry, G. (1999). *What science is and how it works*. Princeton, NJ: Princeton University Press.
- Dyson, F. (2006). *Scientist as rebel*. New York, NY: New York Review Books.
- Ede, S. (2005). *Art and science*. London, England: Tauris.
- Fleener, M. J. (2005). Chaos, complexity, curriculum and culture: Setting up the conversation. In W. Doll, M. J. Fleener, D. Trueit, & J. Julien (Eds.), *Chaos, complexity, curriculum and culture* (pp. 1–17). New York, NY: Lang.
- Gauch, H. (2012). *Scientific method in brief*. Cambridge, England: Cambridge University Press.
- Gimbel, S. (Ed.). (2011). *Exploring the scientific method: A new approach to teaching and learning philosophy of science*. Chicago, IL: University of Chicago.
- Gould, S. J. (1989). *Wonderful life: The Burgess Shale and the nature of history*. New York, NY: Norton.
- Greene, B. (2003). *The elegant universe: Superstrings, hidden dimensions and the quest for the ultimate theory*. New York, NY: Norton.
- Hazen, R., & Trefil, J. (2009). *Science matters: Achieving scientific literacy*. New York, NY: Random House.
- Ingram, D., & Sykes, M. (2005). *An introduction to scientifically based research*. Washington, DC: National Assembly of State Arts Agencies.
- Kirst, W., & Dickmeyer, U. (1973). *Kreativitatstraining*. Reinbek bei Hamburg, Germany: Rowohlt.
- Lightman, A. (2006). *A sense of the mysterious: Science and the human spirit*. New York, NY: Random House.
- Necka, E. (1986). On the nature of creative talent. In A. J. Cropley, K. K. Urban, H. Wagner, & W. H. Wiczerkowski (Eds.), *Giftedness: A continuing worldwide challenge* (pp. 131–140). New York, NY: Trillium.
- Newton, R. (2012). *Why science? To know, to understand and to rely on results*. Singapore: World Scientific.
- Next generation science standards. (2013). Retrieved from www.nextgenscience.org/next-generation-science-standards
- Paul, R., & Elder, L. (2008). *The thinker's guide for students and faculty to scientific thinking*. Dillon Beach, CA: The Foundation for Critical Thinking.
- Perkins, D. (1998). What is understanding? In M. S. Wiske (Ed.), *Teaching for understanding: Linking research to practice* (pp. 39–57). San Francisco, CA: Jossey-Bass.
- Ricoeur, P. (1991). The function of fiction in shaping reality. In M. Valdes (Ed.), *A Ricoeur reader: Reflection and imagination* (pp. 117–136). Toronto, Ontario, Canada: University of Toronto Press.
- Sleigh, T. (2013). Interview with Nene Humphrey. Retrieved from www.lesleyheller.com
- Sullivan, G. (2010). *Art practice as research: Inquiry in the visual arts*. Los Angeles, CA: Sage.
- Youngs, A. (2004). *Interterrestrial Soundings*. Retrieved from art.osu.edu/gallery-images
- Youngs, A. (2005). *Holodeck for House Crickets*. Retrieved from hypernatural.com