# Go Figure! Using the Art of Jasper Johns to Teach Number Concepts

***Discover how to seamlessly integrate the visual arts into a mathematics activity.***

Robin Ward

Paint, pastels, and colorful collages in the mathematics classroom? But, of course! It is hard to deny the natural connection between mathematics and the visual arts, as both disciplines embody the study and use of line, shape (two-dimensional), form (three-dimensional), patterns, proportion, and perspective. In the study and creation of art, students are encouraged to use their intuition, perception, imagination, inventiveness, and creativity while they discern, interpret, reason, and draw inferences. Additionally, children in art classes are observing, envisioning, innovating, and reflecting (Hetland, Winner, Veenema, & Sheridan, 2007). These abilities develop children's intelligence, argues David Perkins (1994), Senior Co-director of Harvard University's Project Zero, as the practice of looking at art requires thoughtful attention to what the artwork has to show and say (National Art Education Association, 2009). In fact, as early as age four, children begin to "think of the visual arts as a tool for communicating" and use this second language to express their feelings and to make sense of the complex circumstances of their lives (Cole, 2012, p. 82). Don't we, as educators want our young children to develop these same talents, cognitive and communication skills, and abilities as they learn mathematics?

A growing body of evidence continues to present compelling evidence that connects student learning in the arts to academic and social skills (Bransford, et al., 2004; Burton, Horowitz, & Abeles, 2000; Deasy, 2002, 2008; Korn-Burtsztyn, 2012; McCarthy, Ondaatje, Zakaras, & Brooks, 2005; McDonald, 2010; Ruppert, 2006). For example, arts instruction can increase learning and achievement by boosting literacy and English Language Arts (ELA) skills, advancing math achievement, and developing critical thinking (Arts Education Partnership, 2013; McDonald, 2010). Arts instruction can also engage and motivate students (Catterall, Dumais, & Hampden-Thompson, 2012; Deasy, 2008; Perrin, 1994; Ruppert 2006; Seif, 2013), strengthen students' problem solving abilities (Hamblen, 1997; Rabkin & Redmond, 2006; Ruppert, 2006), foster mathematical thinking (Seif, 2013), build collaboration and communication skills (Perrin, 1994; Ruppert 2006; Seif, 2013), and increase capacity for leadership (Cole, 2012). Additionally, arts instruction emphasizes the importance of children taking small steps, practicing to get better at something, and being persistent and patient (Burton, Horowitz, & Abeles, 2000; Deasy, 2008; Eisner, 2002; Nathan 2012; Seif, 2013). The visual arts are crucial, particularly in early childhood, as they provide an entry point to engage different kinds of learners and activate the learning and growth of young children (Cole, 2012).

***The visual arts engage different kinds of learners.***

Despite convincing research and strong public support, education budget cuts have forced schools and districts to limit or even eliminate arts instruction. As educators, we need to address the critical need to preserve and, in those cases, re-integrate the arts back into the school curriculum mostly because the arts are foundational to high quality early education (Korn-Bursztyn, 2012). How can we do this? It is easier than you think! Not an artist? Have no fear! Let me share how simple it is to infuse a mathematics lesson with the visual arts.

## Put on Your Math Goggles!

For the last seven years, I have been teaching an integrated mathematics-visual arts program at two preschools in Texas. Each week, I introduce the children to a new artist and, using a PowerPoint slideshow presentation, I show several quintessential pieces of the artist's work. I encourage the students to describe what they see and what they like (or dislike!) in each piece, giving them the opportunity to develop a sense of art appreciation, while honing their observational skills as well as language skills. Next, using simple supplies such as crayons, colored paper, and glue sticks (no paints or easels needed!) students create their own masterpieces in the spirit of the artist. Then, we don our "math goggles" (Ward, 2012, p. 9) and explore a variety of mathematics embedded in the artwork. One of the artists that I have integrated in my mathematics lesson presented to my preschoolers is Jasper Johns.

Jasper Johns' *Color Numeral Series* (1968) is a collection of ten color lithographs featuring a single digit (Johns refers to each of them as a *Figure*) zero through nine. After viewing several of Johns' *Figures*, students were given their own "canvas," a piece of white paper on which was pre-printed a single digit, zero through nine. I chose to create these pre-printed "canvasses" using a Jasper Johns-like font so that the children's finished artwork most closely resembled the artist's actual work. For me, this activity was as much about art appreciation as it was an exploration in number. Additionally, I wanted the focus of this activity to be on number development and relationships among numbers, as opposed to practicing writing numerals, a recommendation of the National Council of Teachers of Mathematics in their *Standards* (NCTM, 1989). Further, at this young age, most children will participate in invented numerals similar to invented spelling where children write numbers in a variety of ways.

Using simple supplies such as crayons and markers, students traced the outline of their *Figures* (see Figure 1). This activity engaged the students' fine motor skills while simultaneously allowing the children to experience *line*, one of the seven elements of art. Next, students adorned their *Figures* in the spirit of Jasper Johns, using stripes and other colorful patterns (see Figures 2 and 3). After they finished creating their Johns-inspired masterpieces, students put on their math goggles and the mathematics lesson began!

I first asked the pre-kindergarteners to simply name the numbers they had colored, an important task,

### Who is Jasper Johns?

Jasper Johns is an American painter, sculptor, and printmaker best known for his artwork featuring maps, targets, letters, and flags. Born in Augusta, Georgia in 1930, Johns' early works reflected the ideas and techniques of abstract expressionism, yet his unique style of endowing focus to familiar, everyday objects in his artwork paved the way for subsequent art movements including Pop art and Minimalism. To view Johns' artwork that inspired this project, go to the Museum of Modern Art, http://www.moma.org/collection/artist.php?artist_id=2923

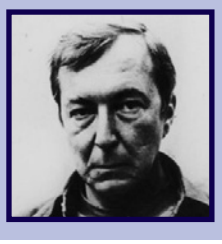

Photo retrieved from http://www.jasper-johns.org/

Figure 1: Pre-K children first outline and then use their imaginations to color their number artwork.

Figure 2: A Pre-K student proudly shows off her Jasper Johns-inspired art.

Figure 3: A pre-K student proudly shows off his Jasper Johns-inspired art.

as Kamii (1982) points out that in order for children to become interested in numbers, they must speak and write them in their environment. Next, I asked students to point to a classmate who had colored a number bigger than their number and to name that number as well. Students justified their reasoning by using blocks. For example, one child, who had colored the number three pointed to a male classmate who had colored the number seven. When I asked her to use the blocks to show me why she thought seven was bigger than three, she first counted out three blocks, placed them into one pile, and then counted out seven more blocks, placing them in a separate, nearby pile. While pointing back-and-forth between both sets of blocks, she then explained that her pile of three blocks was "lots smaller" than her classmate's pile of seven blocks because visually she saw that, "Seven blocks is more… It's more bigger than three. There's more blocks here in the seven." This activity embodied Kamii's (1982) research on teaching number, whereby children need opportunities to quantify objects, and to make and compare sets with moveable objects.

Next, I challenged a small group of students to arrange themselves at the front of the room from least to greatest (see Figure 4) while the rest of the class observed. Although this activity took a bit of time, it was mathematically worthwhile! Watching the children move about as they negotiated their position in the line and hearing the children articulate their thinking and reasoning was fascinating. Even the children who were seated became helpers and problem solvers, verbally assisting their peers as they tried to arrange themselves in ascending order. This activity beautifully embodied Kamii's (1982)

recommendation that children need to socially interact and exchange ideas with their peers.

**The visual arts support the development of both concrete and abstract reasoning skills.**

## Extensions

The list of mathematical questions and challenges a teacher can pose is endless when using student-created *Figures*. For example, with elementary school children, a teacher might ask students to hold their numbered artwork and to separate into two groups of even or odd numbers, or students might arrange themselves from biggest to smallest, giving them practice with counting back. Or, perhaps a teacher could ask two students to hold up their Jasper Johns-inspired artwork and to then compute the sum of their *Figures*. Put on your math goggles and ponder what questions you might ask!

## Conclusion

Using Jasper Johns' art provided these young children with the opportunity to see the connections between mathematics and visual arts and thus delight in a colorful exploration of number. In fact, the level of excitement on the part of the students was truly palpable, in particular, as they arranged themselves in ascending order in the front of the classroom, with the help of their seated peers. Also, when called upon, the children smiled ear-to-ear, as they proudly announced to the class the name of their colored *Figure*. Although this exploration of number could have been accomplished using manipulatives and verbal instruction, this activity deftly and seamlessly provided the added benefit of introducing the children to the world of art.

Research findings show that the visual arts challenge students to use both concrete and abstract reasoning skills to draw conclusions and formulate ideas (Gullatt, 2007). Yet, the deterioration of the arts in the curriculum continues to plague American schools. Demand arts instruction! Thus, I encourage you and your students to put on your "math goggles" and to use the visual arts as a lens for deepening students' mathematical understandings while immersing students in the academic, social, and emotional benefits of arts instruction.

Figure 4: Pre-K students use their numbered artwork to arrange themselves in ascending order.

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## About the Author

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Dr. Ward, a seventeen year mathematics educator, has been published national and internationally in numerous journals and she is the author of five teacher resource books on using art and children's literature in the mathematics classroom. She is regularly heard encouraging teachers and students to "Put on their math goggles!" as a means to see mathematics in their world.


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