

## THINKING TOOLS FOR INNOVATORS: PART 5— FORMING PATTERNS

Recent research has shown that we can build innovative thinkers by reinforcing a set of thinking tools, including such skills as observing, abstracting, pattern recognition, modeling, and transforming (among others). As these skills can all be taught, it makes sense that we can help students become the creative thinkers that we will need in the twenty-first century. This lesson plan is the fifth in a series that is focused on using art to enrich instruction in these critical skills. The research on which this information is based can be found in many sources, perhaps best summarized in the book *Sparks of Genius: The Thirteen Thinking Tools of the World's Most Creative People* by Robert and Michele Root-Bernstein.



Frank Kupka, *Disks of Newton* (detail, France),  
Oil on canvas  
39 1/2 x 29 inches (100.3 x 73.7cm)  
The Louise and Walter Arensberg  
Collection, 1950  
1950-134-122  
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number or phrase into the ARTstor search bar will direct you to the corresponding image in that database.

### Grade Level

For grades 7–9, adaptable for elementary or high school

### Common Core Academic Standards

- [CCSS.ELA-Literacy.RH.6-8.1](#)
- [Mathematics: Modeling](#)

### PA Academic Standards for Art

- 9.3.A: Critical Processes
- 9.4.B: Aesthetic Interpretation

### Art Images Required

Click on the titles below to view high-resolution photographs on the Philadelphia Museum of Art website. Images that are available in the ARTstor Digital Library are indicated by an ID number or search phrase. Entering that

- [Disks of Newton \(Study for Fugue in Two Colors\)](#), 1912, by Frank Kupka  
ARTstor search: kupka disks of newton
- [Abstract Speed](#), 1912, by Giacomo Balla  
ARTstor search: 2007-46-3
- [Nude Descending a Staircase \(No. 2\)](#), 1912, by Marcel Duchamp  
ARTstor search: 1950-134-59
- [Three Musicians](#), 1921, by Pablo Picasso  
ARTstor search: 1952-61-96

## Background

Recognizing patterns is an essential augmentation of observation skills (see “Thinking Tools for Innovators: Observing” in this lesson plan series). Thinking creatively, however, also involves the skill of manipulating and forming patterns. Forming patterns typically involves combining two (or more) elements to create something new. Consider a singer who stays on melody. It can certainly be pleasant, but note what is added when a second singer (or even a third) picks up a harmony. The result can easily be greater than the sum of its parts. Try this: Select three volunteers from class. Tap on something to establish a simple beat (approximately two taps per second). One student is to count from 1 to 10 on each tap, repeating the count over and over. The second student also counts, but only from 1 to 3, repeating over and over. The third student counts from 1 to 4, also repeating. Have the rest of the class listen carefully. What new patterns do they hear as the syncopated counting continues?

## Lesson Process

1. To begin, have students look around the classroom. What patterns can they find? Are items hung on the wall in geometric shapes? Are there visible horizontals, verticals, diagonals? Does the floor or ceiling reveal any patterns?
2. Examine *Disks of Newton (Study for Fugue in Two Colors)* by Frank Kupka. Take a few minutes to review the additional information on the Museum’s website and listen to the audio stop. What patterns do students see? Have the class break those patterns down into their basic structures, focusing on colors, shapes, lines, or how shapes relate to each other (i.e. they are not “colored circles,” they are concentric, intersecting circles; the colors show specific patterns of light and dark). How many patterns can they identify? What effects do these patterns have on them? Can they see any relation between the patterns and Kupka’s choice of title?
3. Now present *Abstract Speed* by Giacomo Balla, and take a moment to review the additional information displayed there. What patterns can be observed? As before, break the observed patterns down into basic parts. What does Balla seem to accomplish in the combination of these patterns that would not be apparent without their combination? Are there any similarities between Balla’s selection of patterns and Kupka’s?
4. Breaking the class into groups of three or four, have each group create a drawing that combines a one pattern of circles and one of straight lines. (Note: A supply of rulers, compasses, or other drawing tools may be helpful here.) No other shapes or patterns are allowed. Each student should supply an idea to the group, and then the group should select and finish their drawing. Have each group display and discuss the patterns they chose and any effect they were trying to achieve.
5. Examine *Nude Descending a Staircase (No.2)* by Marcel Duchamp. Once again, take a few minutes to review the additional information displayed on the Museum’s website. At this point, students should be able to recognize the purpose (or effect) of Duchamp’s patterns. How does Duchamp create the effect of movement? Can the students think of any other ways movement can be represented? How is this accomplished in comic books or graphic novels? Why do we imagine this to be a figure/person? What details provide that impression? What does this aspect of our imaginations reveal about the “background tools” the viewer brings to a work of art, and how does this relationship with the viewer benefit the artist?

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## Assessment

1. Examine *Three Musicians* by Pablo Picasso. Take a moment to review the Teacher Resources connected to this painting. Write an expository essay that describes the basic patterns revealed in this painting, and how those patterns help us see three musicians—despite the fact that very few “realistic” aspects of human images exist.
2. Create a portfolio of patterns, discovered in printed images, advertising, and photographs. Organize your portfolio by arranging the images into groups. To do this, you will need to look for patterns that connect the images together. Your choices of patterns form the criteria for your arrangement. Selecting and applying the criteria for these groups is actually a way of overlaying the images with an additional pattern—one created by the student.

## Enrichment

1. Find selections of geometric patterns, and copy them onto clear acetate. Give three of these acetates to students arranged in groups of four or five. Have the groups experiment with laying one image on top of another, and moving the images to see what is created. Have someone take a picture (using a cell phone is fine) of the more interesting image combinations.