

# Do the Function Dance with Sketchpad® 5: NCSM 2013 Annual Meeting, Session 206

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How better to explore rate of change than letting your independent and dependent variables dance together?

We'll vary  $x$  and  $f(x)$  by doing both real and computer-based dances of functions from several families. Bring a laptop or iPad with Sketchpad, and leave with classroom-ready activities to share with teachers.

The CCSS says students should “describe transformations as functions that take points in the plane as inputs and give other points as outputs.” [G-CO2]

It's well-known that all but the top students have difficulty understanding a function as a process relating dynamic variables.

“For the most part, human beings conceptualize abstract concepts in concrete terms, using ideas and modes of reasoning grounded in the sensory-motor system.” [Lakoff & Nuñez, *Where Mathematics Comes From*, 2000 p. 5]

In this workshop, we'll explore the connection among these statements. We'll use the CCSS admonition to see how geometric transformations can serve as sensory-motor grounding for function concepts, leading to concrete student experiences that help them form robust function concepts.

## Agenda:

Introductions  
Whirlwind Tour of Function Dancing  
Virtual Dances:  
Physical Dances: Get Up and Move!  
Questions and Comments

## Activity List:

Identify Functions: Which is a function?  
Identify Families: Which is unlike the others?  
Invent Your Own: Construct a Reflection Dance  
Restricted Access! Domain and Range  
Function Challenge: Match the Pattern  
Follow the Leader: Dance the Dependent Role  
Home on the Range: Dance the Independent Role\*  
Composition: Three Dancers Dancing  
Solve the Mystery: Taking Turns (MultiTouch)  
Dynagraph 1: Dance Along the Number Line\*  
Dynagraph 2: Dance the Twist\*  
Dynagraph 3: A New Composition

\* Activities with an asterisk are still under development. All other activities have sketches and student worksheets, but may not have complete Teacher Notes.

The activities that you've seen and participated in today are available here:  
[http://www.geometricfunctions.org/function\\_dances.html](http://www.geometricfunctions.org/function_dances.html)