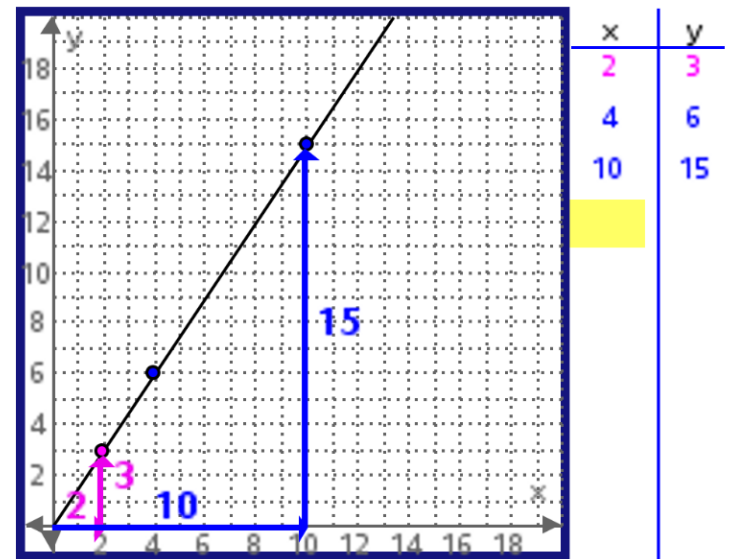
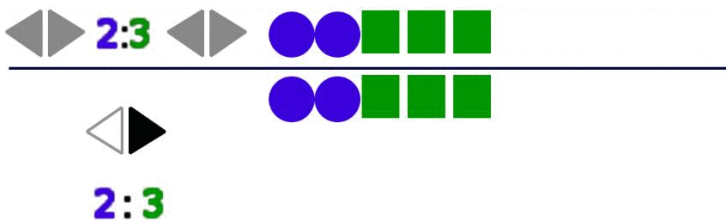


Rate of Change: Algebra to Calculus

Curtis Brown
@cb_ltf
curtis@ti.com

Rate of Change as a concept

- Ratios
 - $a:b$ and $2:3$



Rate of Change as a concept

- Slope?

- $\frac{\text{rise}}{\text{run}}$

- $m = \frac{y_2 - y_1}{x_2 - x_1}$

- $m = \frac{\Delta y}{\Delta x}$

- $m = \frac{f(x_2) - f(x_1)}{x_2 - x_1}$

- $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{(x+h) - x}$

- » Common rates:

- » mpg

- » bpm

- » Mbps

- » fps

- » wpm

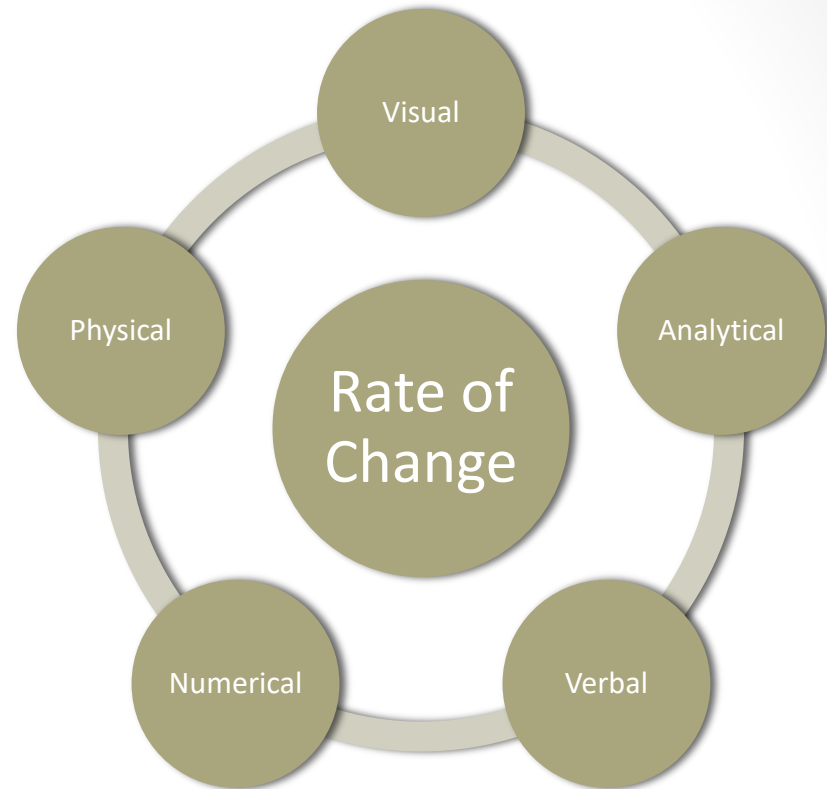
- » \$/hr

- » ppm

- » gpf

Rate of Change as a Concept

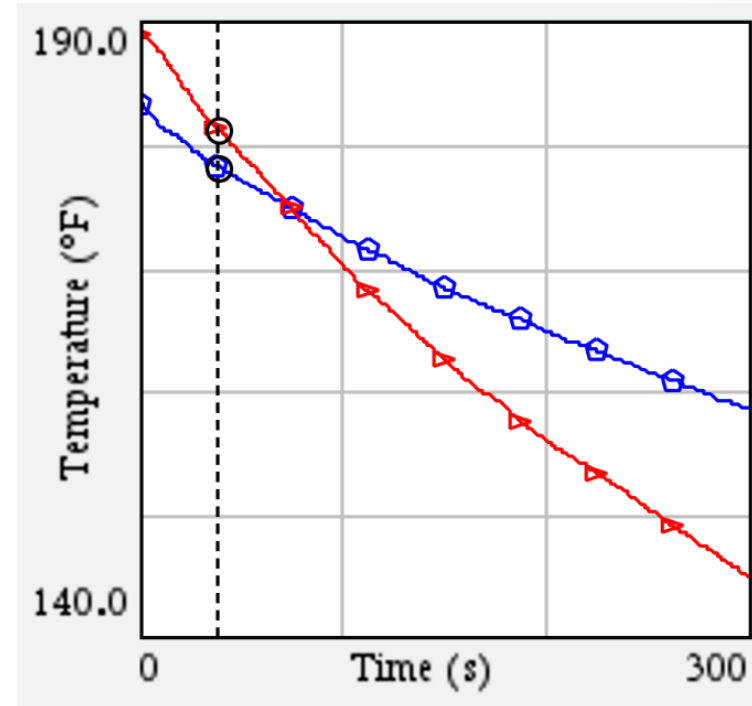
[Using] different representations is like examining the concept through a variety of lenses, with each lens providing a different perspective that makes the picture (concept) deeper and richer (Tripathi, 2008)



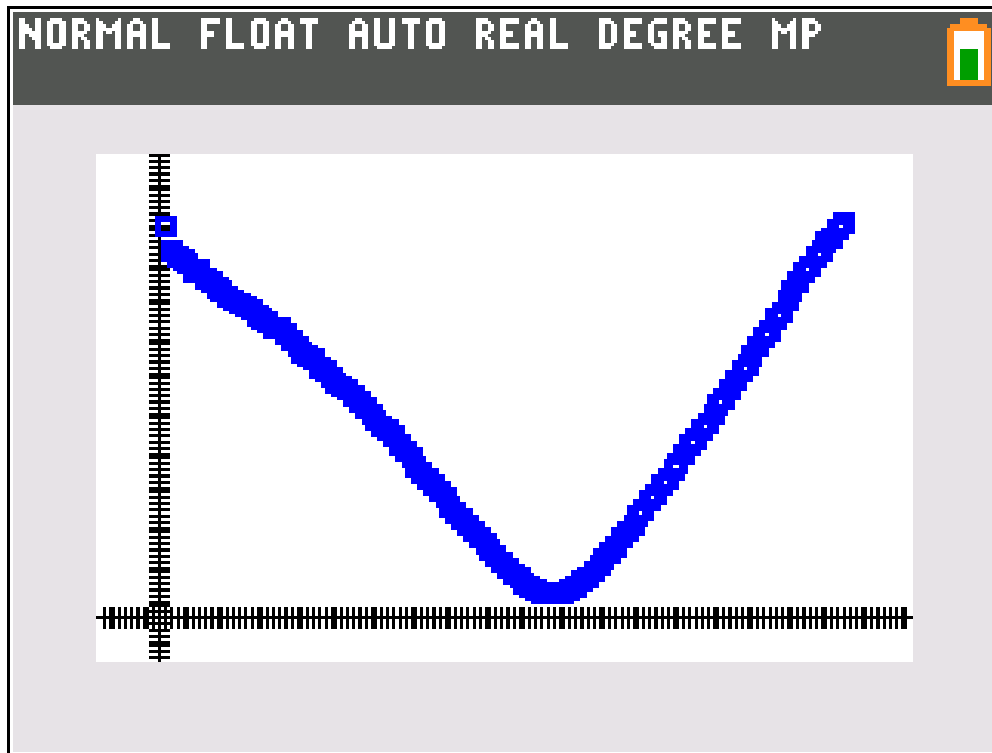
Visual Representations are of particular importance in the math classroom, helping students to advance their understanding of the mathematical concepts and procedures, make sense of problems, and engage in mathematical discourse. (Principles to Actions NCTM p.25)

Rate of Change in a graph

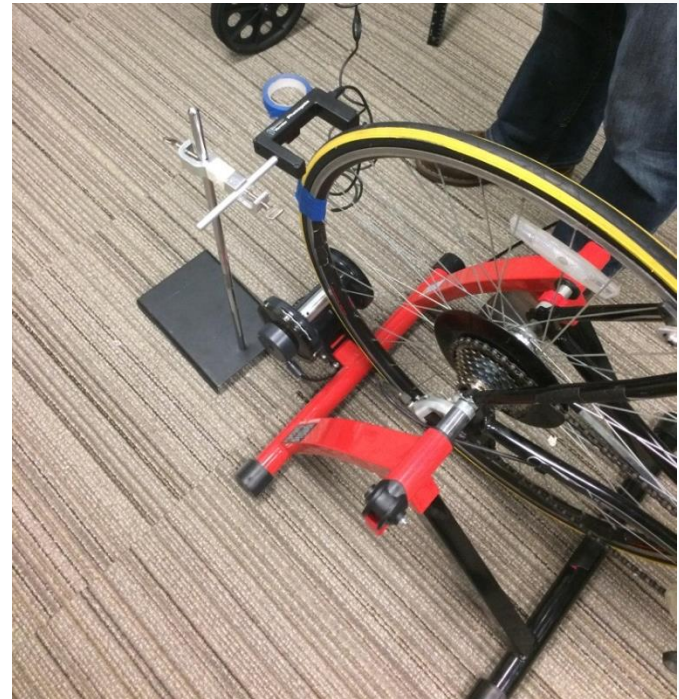
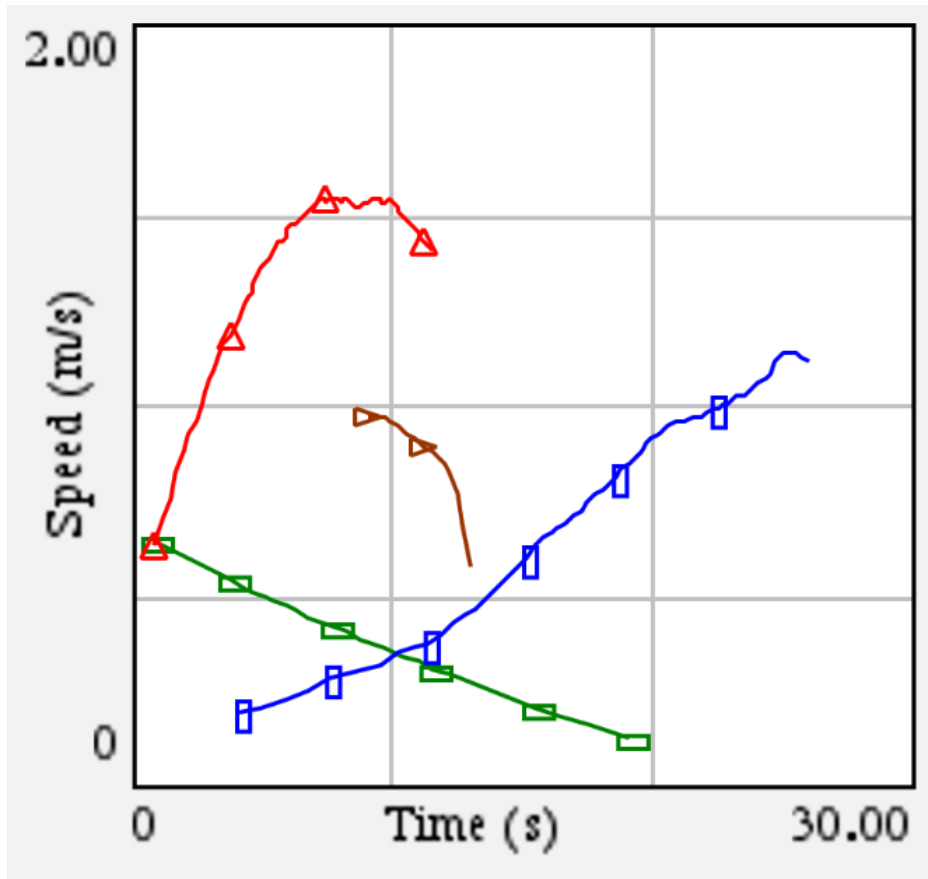
- Instead of just points, let's explore graphs of many types:
 - » Describe how quantities are changing in relation to one another:
 - » Increasing/decreasing
 - » Constant rate
 - » Increasing/decreasing at an increasing/decreasing rate
 - » Associate visual/graphical with context
 - » Numbers aren't important (at least at first)



Rate of Change in a graph



Rate of Change in a graph



Rate of Change as a demonstration

