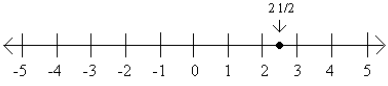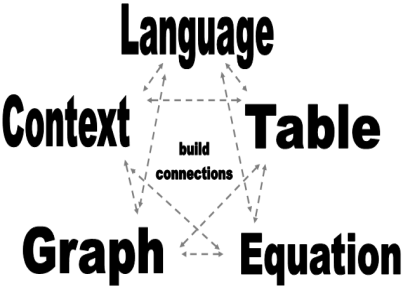When working with **secondary (6-12th grade)** students,

You can NEVER do enough of the following things:

You Can Never Do Enough...	Because...
Modeling with **NUMBER LINES**	• It give students a visual representation for many topics • It is easy to draw anywhere, anytime • It is familiar to most students, so it gives most students language to enter and discuss the problem **Try it with...** Integer Operations
SKIP COUNTING	• It is easy to do anywhere, anytime • It can be adapted for students at ANY grade-level • It reinforces pattern recognition and repetition, which can transition into discussions about rules and equations • It flexes the mental math muscle **Try it with...** Fractions (Be sure to properly name whole numbers!) Starting at a number that is not a multiple of your counter (ex. Skip count by 3's starting at 14) Counting backwards beyond zero, into negative numbers
GRAPHING	• It is one area that students have multiple opportunities to see outside of the classroom • It is a skill that is necessary for multiple subject areas • It is easy for students to make seemingly small errors that make a big difference **Try it with...** Different types of graphs and make comparisons ("What do all of the graphs have in common?") Discussing when it is appropriate to use the different types of graphs ("What does this graph explain/show best?")

Transitioning between the **5 FORMS OF A FUNCTION**	• It builds a deeper conceptual understanding of functions
	Try it with...
	Starting with any of the 5 representations and creating the others
	  ♦ Tables
	  ♦ Graphs
	  ♦ Equations
	  ♦ Context
	  ♦ Language

You Can Never Do Enough...	Because...
Getting students to **EXPLAIN THEIR THINKING**	• It forces students to think about what they are doing, not just getting the answer • It gives better insight into student understanding and reveals misconceptions **Try it with...** "What do you notice?" "Think out loud." "What is going on in your brain?" "Tell me what you are thinking."
Creating **EQUIVALENT EXPRESSIONS**	• Students struggle with the ideas that 2 things that look different can be equal to one another. **Try it with...** Fractions $\dfrac{1}{2} = \dfrac{2}{4} = \dfrac{3}{6}$ Algebraic expressions $2x + 3 = 5x + 3 - 3x$ or $x^2 = (x)(x)$ Rational Numbers $0.75 = \frac{3}{4}$ or $5 = \dfrac{-5}{-1}$ Forms of linear equations (While these are not expressions, this will still helps students build the idea of equality)
Assuring students have a **FLEXIBLE UNDERSTANDING OF THE BASE TEN NUMBER SYSTEM**	• A deep understanding of place value is one of the 2 major concepts all elementary students enter middle school weak in. **Try it with...** Decomposing and composing integers (542 = 500 + 40 + 2) Saying 5.62 without using the word "point" ("5 and 62 hundredths") Using base 10 blocks
Discussing real-life examples of **RATIOS, RATES and PROPROTIONAL RELATIONSHIPS**	• Proportional reasoning is the #1 weakness of high school mathematics students. • Understanding ratios, rates and unit rates deepens students understanding of proportions. **Try it with...** Grocery store data (cost per ounce) Speed of human running, car driving, etc. Create ratios comparing anything you see around you (ratio of boys to girls, ratio of boys to all students, ratio of pencils to pens, etc.)