Automaticity Tidbit #2—Where Does "It" Begin (PRE-Prerequisites)

Fact: All students must learn to think mathematically and they must think mathematically to learn. **(Adding It UP)**

Fact: To Mathematize Children's World they need to begin seeing it mathematically.

Fact: Infants are sensitive to quantity and can make good quantity comparisons. (subitizing) Brains are hard wired to numbers. The quantity of a small collection can be intuitively perceived without counting. **(Big Ideas of Early Mathematics)**

So What? I will tell you what! This understanding of number begins from day 1 of existence! Okay, maybe not day 1 but pretty early! Parents/guardians need to realize that they play a HUGE role in **Mathematizing** their child's world. What does that mean? "The term mathematize has emerged to express the importance of helping children engage with the mathematics around them. We are hoping that parents and early childhood teachers will begin to look at the world through a 'math lens'. And as adults, we offer feedback that helps children see the math underlying these situations and that we are purposefully inviting the children to attack an active role in problem solving." (Big Ideas of Early Mathematics) Talking about Math in the world is a good way to have children think mathematically about their world! It begins at home! Mathematics is actually an activity of mathematizing the world, of modeling, of schematizing, of structuring one's world mathematically. (Frueudenthal, Fosnot)The process of mathematizing is constructive, teachers need to walk the edge between the structures of mathematics and the development of the learner. (Frueudenthal, Fosnot) Parents and

teachers need to get mathematics into children's eyes, ears, hands and feet—multi modes of learning! Research confirms that during all stages of development the more modes the learner accesses the deeper the learning. Hello, in preschool (and before) a child's mathematical knowledge begins to develop in an individual way that depends on the environment in which he/she grows up…think about it!

So how does one mathematize one's world? NUMBERS ARE EVERYWHERE! There is alot of experiences, language, and gesturing going on! WHAT?! Language and math skills are strongly connected: the math-related language that children hear and build into their own vocabularies helps them make sense of their mathematical world. Research supports that the math achievement gap may be related to kids experiences with language, and in particular math-related language. So using words like pointy, curved, taller, shorter are words that describe spatial relationships and the stronger a student's spatial abilities the more likely they will do well at math and science! (Growing Mathematical Minds)

Experiences and talking using math terms deepens our young mathematicians understanding….but what is gesturing? Have you ever listened, and watched, people giving directions and their hands are moving to help explain their thinking? Well, that is the jest of gesturing! Usually, we are unconscious of our gestures but they are reinforcing and often clarifying the information in our speech! Gestures are critical and research supports that children were able to show more knowledge about quantities with number gestures than they could with number words! Gestures are spontaneous and often used unconsciously but always meaningful! So, it seems that the use of gestures enhances learning. And we thought it was just drama!?

So What? Do rich experiences, math conversations and gestures really help to become automatic? They are all indicators of a child thinking mathematically. Students cannot be fluent without an understanding of number…they can memorize but they will not think flexibly. So be aware of 'where' your students are coming from so you can move them forward! "Good teaching starts with knowing what the children understand." (Children's Mathematics 2nd) You, the teacher, have to understand what you are teaching to teach for understanding. So, absolutely, experiences, math conversations (language) and gestures do help with automaticity.

So What? But what kind of experiences are we talking about? We can find math in most situations. Taking a walk, putting away toys, making lunch, math is everywhere…Look for it! We do know that **SETS** are basic to children's thinking and learning AND basic to our number system…count how many are in the set.. alot, few, many, matching , combining, comparing, ordering… A set is any collection that is grouped together in some meaningful way. (Big Ideas of Early Mathematics) Some sets can be **SORTED**. Sorting is different from matching because it involves reorganizing a whole collection (set) into two or more subsets depending on the attribute(s) that are used to sort the objects. And as we naturally make sets and sort objects we are using rich language and subconscious gestures. We are setting the kids up for mathematical success!

AND there will be little mathematical success without **NUMBER SENSE**. Number sense is to math as phonemic awareness is to reading. It's not going to just happen!

Next Up -Making Sense of Number Sense!