Counting to Calculus

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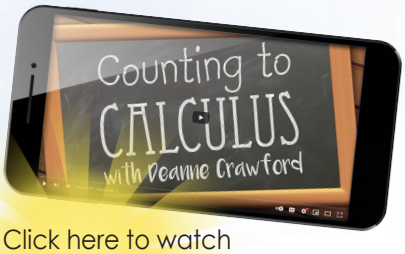

Click here to watch
Deanne discuss math education
history and programs in our
video on: YouTube

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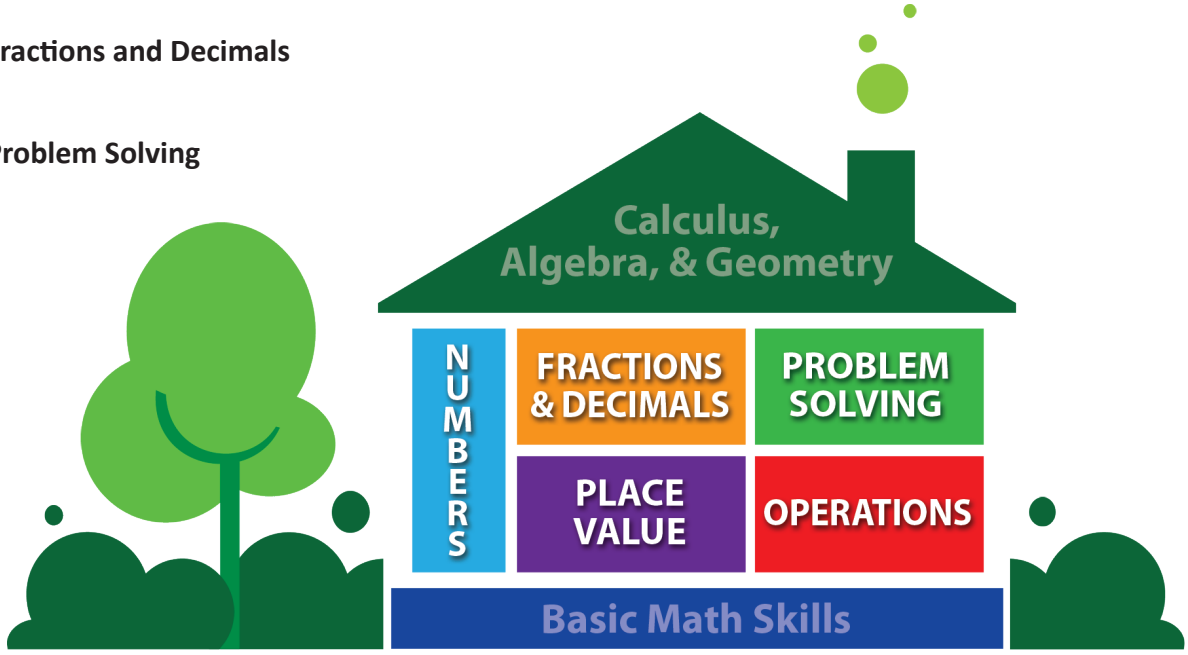
Math Building Blocks:

Basic math skills provide the floor of your math house, and the advanced math courses (Algebra, Geometry, Calculus) provide the ceiling in your house. In between your floor joists and the roof, lie five building blocks, which provide the cornerstones of your math house.

1. **Numbers**
2. **Place Value System**
3. **Operations of Whole Numbers**
4. **Fractions and Decimals**
5. **Problem Solving**



Notes: _____

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1. NUMBERS with Activities* by Developmental Stages:

Infant to 3 Years:

- Sing and Recite numbers to your child.
- Introduce counting and sorting.

Two to Three Years:

- Child will begin to associate a number with the quantity.
- Teach children to count and sort.
- Introduce basic math language in relationship to objects: under, over, behind, fast, heavy.
- Teach child their age with fingers.

Three to Five Years:

- Will develop the ability to count to 5 items (possibly 10 items).
- Will begin to recognize written numbers.
- Will develop the ability to count the next number in sequence.
- Build upon the Count and Sort Activity.
- Around 3 years, teach address and phone number.
- Between 5-6 years, will be able to count 1-100. May be able to skip count by 10s to 100.

Six Years and Up:

- May be able to count to 200.
- Sorting and Classifying will become more complex.
- Will begin to understand number representation on a number line.
- Will begin to associate less with counting (ie: 7 is less than 8).
- Perfect time to introduce skip counting by 2s, 5s, 10s.
- Understands ordinal terms like first, second, third.

*Please note: these are for reference only and not indicative of developmental delays or giftedness.

2. PLACE VALUE SYSTEM Activities*:

Infant to 3 Years:

- Counting.

Three to Five Years:

- Master counting to 100.
- Teach child to build numbers concretely with snap cubes or connecting cubes (or items found at home).
- Teach sets of 10 after proficient with building numbers concretely.

Six Years and Up:

- Still operates in concrete thinking, so manipulatives or visual representations are critical to success. Use manipulatives to teach math concepts esp. place value.
- Will begin to understand place value at 7-8 years.

3. OPERATIONS OF WHOLE NUMBERS Activities*:

Infant to 3 Years:

- Between 2-3 years, will begin to understand simple addition using objects.

Three to Five Years:

- Children continue to develop understanding of simple addition-by age 6, may be able to add up to 6 objects.
- Around 5, will be able to solve simple story problems.

Six Years and Up:

- From 5-6 years, children experience an exponential growth in their ability to understand more complex math operations.
- May be able to add small numbers in their head.
- From 7 years and up, children will be able to add/subtract multiple digit numbers (using concrete objects) without borrowing or carrying.
- Teach more complex story problems with manipulatives.
- Build on previous teachings on sets.

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4. FRACTIONS AND DECIMALS Activities*:

Familiarize children with process of parts to whole — this is a more abstract concept.

Infant to 3 Years:

- Teaching and understanding shapes is foundational.

Three to Five Years:

- Beginning around 3 years, children can be introduced to the parts to whole concept.
  - Share a chocolate bar.
  - Serve an uneven number of cookies.
  - Help cut foods.
  - Coloring activities (Paper plates color ½, then ½ of ½ — or 1/4).

Six Years and Up:

- Show fractional size differences with food.
- Introduce fraction manipulatives

5. PROBLEM SOLVING Activities*:

Make a part of everyday.

Infant to 3 Years:

- Explain patterns — usually between 12-18 months will be able to recognize simple patterns in daily routine.
- String beads or use pegboard together and follow a pattern.

Three to Five Years:

- Begin to understand single step problems and develop multistep problem solving in later preschool years (and beyond).
- Build on pattern activities and enlist their help sorting laundry. Make it a game!
- Allow free play with LEGO® and DUPLO® bricks.
- Introduce puzzles.
- Cook together.
- Around 4- 5 years, more deductive reasoning.

Six Years and Up:

- Deductive reasoning blossoms between 6-7 years.
- Recognizes the idea of equal or same as.
- Develops algebra sense.
- Great time to introduce estimating.

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ADDITIONAL SUPPORTS in our Math House:

Infant to 3 Years:

- GEOMETRY AND SPATIAL SENSE
  - Most 1-year olds, will understand that a hidden object still exits. Play Peek A Boo to reinforce this concept.
  - Introduce shapes, use Shape Sorters.
  - Knob Puzzles.
  - 3-5-piece puzzles.
  - Crafts.
  - Teach into, over, under, around etc. outdoors using play equipment.
  - Build tents with boxes, chairs/cushions etc.
- MEASUREMENT SKILLS
  - Teach concepts tall, short and big, small.
  - Free play with buckets -encourage pouring.
- CALENDAR AND WEATHER
  - Introduce weather related terminology.
  - Read fun children's books together (see *Helpful Resources*, page 7).
- TIME AND MONEY
  - Introduce terminology daytime, night time primarily.
  - Won't grasp money concepts, but can talk shapes of coins, size, etc.

Three to Five Years:

- GEOMETRY AND SPATIAL SENSE
  - Puzzles.
  - Shapes in the world around them.
  - LEGO® and DUPLO® bricks, Tangrams etc.
- MEASUREMENT SKILLS
  - Bucket play-talk about more and less. Introduce different shape containers.
  - Around 5 years, introduce measuring cups (1 cup, ½, and 1/4 when ready).
  - Compare object size.
- CALENDAR AND WEATHER
  - Between 4 -5 years introduce days of the week and related activities.
  - Around 5 years, begin teaching months, weeks and years.
  - Teach Calendar and Weather concepts together.

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Three to Five Years (continued):

- TIME AND MONEY
  - Around 3 years, will understand “before” and “after”.
  - Set a schedule as much as possible.
  - Around 5 years, introduce the concepts of hour and half-hour.
  - With 3-year olds, begin to introduce coins: size, shape, how it feels to touch.

Six Years and Up:

- GEOMETRY AND SPATIAL SENSE
  - Puzzles build geometry and spatial sense.
  - Allow to look at a shape for a couple minutes, remove it, and then have them draw it.
  - Will be able to recognize shapes regardless of orientation or size.
  - Around 7 years, will use and understand various terms that describe physical locations.
- MEASUREMENT SKILLS
  - Around 6 years, ready to move beyond basic descriptive words for size. Introduce measurement of things around the house with other household items (eg: pencils—no rulers yet). Create simple graphs.
  - Cook together.
- CALENDAR AND WEATHER
  - Between 6-7 years, will master days of the week, months, seasons.
  - Talk more about weather-create a weather graph for the month.
- TIME AND MONEY
  - Begin to tell time by hour; half hour.
  - Work on skip counting by 5s (introduce time in 5-minute increments).
  - Teach money concepts as they related to value-will be able to understand the concept that 4 quarters equals one-dollar bill.

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HELPFUL RESOURCES

Websites & Videos:

- **PBS Parents Learn and Grow**
  https://www.pbs.org/parents/learn-grow
- **Saxon Math:**
  Programs: https://www.rainbowresource.com/saxon-math
  Video: https://www.youtube.com/watch?v=L8TFaT0gR1U
- **Singapore Approach Math:**
  Programs: https://www.rainbowresource.com/singapore-math-programs
  Videos: https://tinyurl.com/34282h8y
- **World Book Typical Course of Study**
  https://www.worldbook.com/typical-course-of-study.aspx

Books & More:

- *Grocery Cart Math*
- Math in Nature Series
- *Early Bird: Weather* (Evan Moor)
- *What your _____Grader Needs to Know* (PK-6)
- *Right Brain Math* (Dianne Craft)
- *Right-Brained Math* (Child1st)
- Pizza Fraction Fun
- Fraction Circles
- MathLink Cubes/Activity Sets
- Your Business Math Series
- Mathseeds
- Young Mathematicians Family Kits

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MATH CURRICULUM COMPARISON CHART

	MATH Programs	Grades													Religious Content		Price Range		
		PK	K	1	2	3	4	5	6	7	8	9	10	11	12	Christian	N/Secular	$	$$	$$$
1.	Saxon K-3 *		•	•	•	•											•			•
2.	Saxon 3-12 *					•	•	•	•	•	•	•	•	•	•		•		•	
3.	Math•U•See *	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•			•
4.	Abeka Math	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•
5.	Horizons Math (AOP) *		•	•	•	•	•	•	•	•	•					4-8	K-3		•	
6.	LIFEPAC Math (AOP) *		•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	
7.	BJU Math		•	•	•	•	•	•	•	•	•	•	•	•	•	•				•
8.	enVision Math		•	•	•	•	•	•	•	•	•	•	•	•	•		•		•	
9.	CTC Math		•	•	•	•	•	•	•	•	•	•	•	•	•		•		•	
10.	Christian Light Math *			•	•	•	•	•	•	•	•	•	•	•	•	•		•		
11.	Life of Fred			•	•	•	•	•	•	•	•	•	•	•	•		•	•		
12.	Simply Good & Beautiful Math *		•	•	•	•	•	•	•	•	•					•		•		
13.	Primary Math (Singapore) *		•	•	•	•	•	•	•								•		•	
14.	Math in Focus 2020 (Singapore) *		•	•	•	•	•	•	•	•	•						•			•
15.	Jump Math			•	•	•	•	•	•	•	•						•	•		
16.	ShillerMath	•	•	•	•	•	•	•	•	•							•		•	
17.	Mathematical Reasoning	•	•	•	•	•	•	•	•	•	•	•					•	•		
18.	RightStart Mathematics *		•	•	•	•	•	•	•	•							•			•
19.	Purposeful Design Math (2nd Ed.)		•	•	•	•	•	•	•							•				•
20.	Math Lessons for a Living Education (Master Books) *	•	•	•	•	•	•	•	•							•		•		
21.	Calvert Math	•	•	•	•	•	•	•									•		•	
22.	MCP Mathematics		•	•	•	•	•	•	•								•	•		
23.	Liberty Mathematics		•	•	•											•		•		
24.	Generations Math		•	•	•	•										•			•	
25.	Miquon Math			•	•	•											•	•		
26.	Math with Confidence		•	•	•	•	•	•	•								•	•		
27.	Making Math Meaningful		•	•	•	•	•	•	•	•						•		•		
28.	Math Mammoth (Light Blue series) *			•	•	•	•	•	•	•	•						•	•		
29.	Beast Academy (from Art of Problem Solving) *			•	•	•	•	•	•	•	•						•		•	
30.	Discover! Math			•	•	•	•	•	•								•		•	
31.	Rod & Staff Mathematics			•	•	•	•	•	•	•	•					•		•		
32.	Conventional (Spunky Donkey) / Study Time Math			•	•	•	•	•	•	•	•					•		•		
33.	Exploring Creation with Mathematics (Apologia) *			•	•	•	•	•	•							•			•	
34.	Charlotte Mason Elementary Arithmetic			•	•	•	•	•	•								•	•		
35.	Strayer-Upton Practical Arithmetic					•	•	•	•	•	•						•	•		
36.	Starline Press Math					•	•	•	•	•	•	•	•	•	•		•			•
37.	Math Power Basics								•	•	•	•	•	•	•		•	•		
38.	Art of Problem Solving *								•	•	•	•	•	•	•		•		•	
39.	Principles of Mathematics * / Algebra 2									•	•			•	•	•			•	
40.	A Fresh Approach										•	•	•	•	•		•		•	
41.	Jacobs Math											•	•				•			•
42.	Memoria Press Algebra									•	•	•	•				•			•
43.	Math Without Borders											•	•	•	•		•			•
44.	Summit Math								•	•	•	•	•	•			•		•	

This chart was assembled by Rainbow Resource Curriculum Consultants and is intended to be a comparative tool based on our own understanding of these programs and is not necessarily reflective of publishers' opinions. Some designations are "best fit," not absolute.

Placement tests are available on our website for programs marked with an ('*').
Find them at: ***https://www.rainbowresource.com/catalogsearch/result?q=math%20placement%20tests***

	Approach			Manipulatives			Teacher Involvement			CCSS Aligned	Notes
	Spiral	Sequential	Conceptual/Topical	Req	Opt	RRC kit	Low	Med	High		
1.	•			•		•			•		Scripted teacher manuals.
2.	•				•		•				Teaching tutorials available separately.
3.		•		•				•			Skip Count CD includes Christian lyrics. Two Algebra paths: Legacy or Principles of Secondary Math.
4.	•							•			
5.	•				•	•		•			Colorful, consumable workbooks in all grades.
6.		•					2-12	K-1			Monarch online only available from AOP.
7.	•								•		Paper manipulatives included.
8.		•						•		•	Digital component.
9.		•					•				Digital courses; single or cost savings family subscription. Automatic grading. Self-pacing.
10.	•							•			Suggested manipulatives for lower grades.
11.		•					•				Brief Christian references in elementary levels.
12.	•			•			4-8		K-3		Free, online teaching videos for grade 4 and up.
13.		•			•	•		•			Several versions of Primary Math available. Refer to the *Singapore Approach Math Comparison Chart*.
14.		•		•		•		•			Accelerated option available in 7th for Algebra prep.
15.		•							•	•	Free online teacher resources.
16.		•		•					•		Discovery, Montessori approach.
17.	•						•				
18.	•			•					•	•	Manipulative Kit sold separately.
19.		•			•	•			•		e-book option for teacher edition.
20.		•						•			
21.		•			•			•			
22.		•						•			Modified Sequential.
23.		•							•		Consumable workbooks.
24.	•			•					•		All-in-one student and teacher book.
25.			•	•					•		Uses Cuisenaire rods.
26.	•				•	•		•			
27.		•		•				•			
28.		•			•		•				Free videos online.
29.			•				•				Recommended for gifted students. Online Academy available.
30.		•			•	•		•			Numerous multisensonsry activity suggestions.
31.		•						•			
32.	•							•			Optional manipulatives for Spunky.
33.		•		•		•		4-6	1-3		Free online resources; activity/project based. Optional tests in Grades 4 - 6.
34.		•		•					•		Grid notebooks recommended. Geometry w/ L5&L6.
35.		•						•			No Teacher Guide.
36.		•					•				
37.		•					•				Written at 4th grade reading level.
38.		•					•				Recommended for gifted students.
39.		•					•				
40.		•					•				
41.		•					•				Teaching tutorials available separately.
42.		•					•				Streaming instructional lessons available.
43.		•					•				MWB Teaching tutorials available separately.
44.		•					•				Resources (free & fee-based) at publisher's website.

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