

Manipulatives for Fun and Learning

(includes chart)

Manipulatives not only are FUN and EFFECTIVE LEARNING TOOLS, but also help develop FINE-MOTOR SKILLS. These skills are essential in later work life in areas such as screwing in nuts and bolts to fix or build things and in household tasks such as sewing on a button or decorating a birthday cake. Gross-motor skills (such as running, jumping, sports) also need to be developed for good fitness yet it is the fine-motor skills that are used more so to effectively handwrite, cut with scissors/knives, and paste with precision.

Manipulatives are used throughout all primary grades and some in the middle and upper grades (especially in math). We do not think they are just an "optional extra"; they are very valuable and important! When a child does not use manipulatives, grasping the concept of the lessons is often slower, time-consuming, and not as enjoyable; you may need to repeat the lesson over and over until it is properly grasped. Manipulatives resemble "little toys" to play with and a child sees relevance (math in the "real life" of a child means playtime). This makes math meaningful, motivating, and understandable if he or she can see a concept "concretely".

TIP 1: Using manipulatives that are easy for a child to handle is a simple and effective method not only to teach the actual concepts of math and language arts but also to help their finger precision/accuracy and eye-hand co-ordination. A few "flat" things are OK but we highly recommend that you try to use more 3-D objects what are easier to pick up. For this reason, we don't really recommend that you print off a lot of paper manipulatives to cut up into tiny bits unless using those bits for "math art". The 3-D ones will hold a child's interest longer! So aim for "chunky".

TIP 2: Rather than using the same manipulative (type of little toy) for all math lessons, arrange your manipulatives so that they are used to "teach" one or just a few skills. Use a different manipulative to "teach" a totally different concept. The skill-object association (i.e. in language arts we call it "word-picture association") is strong in childhood and this wee tip can help your student have a skill stick a little stronger I think if you arrange your manipulative collection this way. I have found even more success with it in our home. Perhaps it is why my mom told me when we were just starting out to homeschool, "Joy, invest in a variety of math manipulatives and you won't regret it. It will make your life easier teaching." What this looks like as an example goes like this: If I use drinking straws, I really could try using them for grouping into tens and hundreds (place value), time (in groups of 5's around a clock), patterning (pink straw, orange straw, pink straw, orange straw), graphing, measurement ("how many straws long is our kitchen table?"), addition and subtraction. But doing that can get rather "busy" to remember. So I just use straws for place value and maybe time. And I use other types of manipulatives for addition and subtraction. And still other ones for measurement.

(Actually, because I keep math in unit chunks for much of elementary math, I organize my manipulatives according to a math unit for storage purposes so that when I need something for a particular unit, I can just go to the manipulative storage shelves and not only find it quickly, but also re-associate a concept to an older student by using something that he or she would already remember as teaching them something in that same topic in a prior year.)

TIP 3: "Hands-On/Visual Learners": In the education field, teachers are trained to teach children by introducing concepts using the "concrete" (actual or model size items), then the "semi-concrete" (pictures representing item in a workbook), and then, finally, the actual number or word that is being taught. This works for many children.

But do you have a child whose strength is a "hands-on learning style" more than other children? Hands-on learners require more of the "concrete" and less of the "semi-concrete" than the average learner. Therefore to help your child learn better and easier, you will need to provide more manipulatives/hands-on learning opportunities with your lessons and fewer (or no) workbook pages that have small pictures on them. Skip right over to the large-print workbooks that have actual numbers to work with and few graphics to distract or frustrate.

At least one of our children could not stand the little pictures in typical consumable math workbooks. If she was instructed to count butterflies on a line, she would be too distracted in memorizing their design in how they were drawn or would cry because these tiny things became a blurr to her as she tried to count them. Yet, she could easily glance at a bunch of real objects without individually counting them out and quickly get the correct answer.

What follows are suggestions for how to use manipulatives, especially for teaching preschool and primary-level home-educated students. **Please note that many of these items are too small to be played with by children who are under 3 years old or who are still putting toys into their mouths. Please exercise parental prudence when using them with an older child and aim to have chokeable items out of reach and under close supervision.**

Where to find the commercially-made manipulatives... Check an educational store or online at Amazon which has been known to offer some of these items at less-than-wholesale prices. We have very few manipulatives left in-stock. (Full disclosure: We are not affiliated with Amazon.)

(There are more tips within this chart as well.)

Item Name	<u>What To Do With It</u>
Coloured drinking straws and about 20+ elastic/rubber bands (100-500 straws).	<p><u>Place Value:</u> Give a handful of straws and have child count and put together groups of ten with an elastic to find out how many. 10 groups are further bond into hundreds to teach the concept of what 10's and 100's and 1's really look like. Line up the groups in columns like the place value chart.</p> <p><u>Time:</u> Have the child band together 60 straws in groups of 5 and place them in a circle (like sun's rays) to count by five's in a clockwise direction.</p>
Shaped little wooden shapes with numbers 1-50 written on both back and front with permanent marker or black pen. (Paper is quite thin for easily picking up by little hands but the wood is thicker.) Find these little wooden shapes in a craft section of a store.	<p><u>Sequencing:</u> Have child order them, greater to less and less to greater.</p> <p><u>Even and Odd:</u> Have child find and arrange in order, just the even numbers. Repeat with the odd numbers.</p> <p><u>Factoring:</u> Put numbers to factor in front of child (you will need more shapes with numbers less than 10 written on them for this – especially extra 2's, 3's, and 5's) Have child pick out all prime numbers.</p>
Sidewalk Chalk (if access to drawing on cement driveway or sidewalk) OR A Long Skipping Rope OR Shelf Paper	<p><u>Skip Counting:</u> Mark it like a number line. Have child jump on 2 feet only landing on 2, 4, 6, 8, 10, etc. as they count by 2's. (You can also use this for teaching or enforcing the concept of odd and even numbers by jumping on the opposite numbers). Count forwards and backwards. (You can hop on 1 foot for counting by one's). Count by 3's by using 2 feet plus a hand on 3, 6, 9, 12, etc.. Count by 4's with 2 feet and 2 hands (leapfrog) if the numbers are close enough for your child to reach by jumping.</p> <p>The children enjoyed helping me with a homemade number line (on a roll of shelf paper) that included negative numbers, decimal numbers, and fractional divisions for Gr. 4.)</p>
Fraction Dice (1 or 2)	Roll dice and draw the fraction listed. In later grades with 2 die, you can throw them to have the child add and multiply the fractions. You can also throw 2 die for a comparison of greater than or less than concepts.
Pattern Blocks (Use with a pattern block activity book or cards or on their own.)	Lessons that can be taught with these blocks include: perimeter, patterning, shapes, area, estimation, graphing and symmetry
Seashells, measuring gram weights, and a balance/rocker scales	<p><u>Measurement:</u> Measure the weights of items around the home and do comparison of various items.</p> <p>Two of our children decided one day to play with our balance and see how much each shell weighed. Finally, we had found a great use for their small collection of SHELLS beyond just looking at them! Shells are great for this activity since each shell is unique and represent a variety of sizes.</p>
Centimeter Cubes	<p>We use these to teach four concepts in our family...</p> <p><u>Sorting/Classifying:</u> Sort into colour groups.</p> <p><u>Estimation:</u> Put in paper bag and guess how many.</p> <p><u>Measuring:</u> Length in centimeters or weight in comparison to something on the other side of a balance.</p> <p><u>Multiplication:</u> Line up squares like rows of desks (with a bit of space in-between) to illustrate multiplication.</p>

<p>At least one set of stuff to sort/classify/pattern and maybe even string together. (I recommend 3-6 sets for most young families.)</p> <p>Plastic Rubber Counters, Pompoms, Beads, Buttons (not just the plain tiny buttons – you need a variety of sizes and colours)</p> <p><u>Regarding other around-the-home manipulatives:</u> Dried seeds have to be big enough to handle easily, e.g. large kidney beans, popped corn, and bigger. Coloured paper clips of various sizes and cardboard pictures can be used but may not be as interesting to some children as they are flat. Bread tags (or other recyclable junk like plastic bottle lids, pop can tags, etc.) are flat and boring – I hardly used my collection and eventually disposed of it. Nuts and bolts are expensive and present a safety hazard in families of young children. Real nuts in their shells (e.g. walnuts, acorns, peanuts, etc.) are also expensive but might be useful around Christmas if you have them already on-hand. Rocks may be O.K. but may scratch tables or present a safety hazard, and they may be difficult to find if you don't live in a rocky area. Like shells, leaves, sticks, and other natural items, it may be hard to find enough of the “same kind” in order to make your set suitable for sorting, grouping, and patterning.</p>	<p><u>Sort:</u> Sort by colour (red vs. yellow), size (big, medium, small), shape (round vs. corners), kind of item (babies vs. mothers or cars vs. trucks or grapes vs. apples).</p> <p><u>Patterns:</u> from the simple blue green blue green to complex 3-D patterns where the child uses height as well as horizontal lines for a pattern and even can build out in a cross-shape. (You can also make patterns with small chart stickers but then these are not reusable and are also harder for small fingers to grasp.)</p> <p><u>Beading and Counting:</u> helps a child with handwriting skills (including the skill of being able to colour a picture within the lines) because it is very fine-motor skill practice. Can also be used for skip counting (3 beads of one kind, then 3 beads of another kind, etc.)</p> <p><u>Graphing:</u> Grab a handful or two and sort what you grabbed into colour groups and graph it in a bar graph.</p> <p><u>Compare Size</u> (tall, short, etc.) and/or <u>Compare Weight</u> (with a balance)</p> <p>The “around-the-home” items that I've found most useful to illustrate these math concepts are a large variety of buttons (size: a quart jar or two jars full). Buttons also hold the child's interest far better than beans or paper clips. I have my children work with the buttons within the boundaries of a large metal cake pan (or you could use a cookie sheet). This helps to prevent buttons falling on the floor.</p> <p>If you are working outdoors in the fall and you live where there is a variety of trees, leaves are neat to sort according to “kinds”. They dry out quickly and crumble if you collect them and bring them indoors for a few days.</p> <p><u>Our favourite counters for most versatility:</u> the “Mini-Motors” set of colourful vehicles and large pompoms (which are also handy for a quiet “toy” that doesn't roll too far).</p>
<p>Pegboard with 100 Pegs</p>	<p>Use for hundred chart concepts on this 10 x 10 grid such as counting, sorting, patterning, multiplication, tessellation designs, perimeter, etc. Helps to develop fine motor coordination.</p>
<p>Time Flashcards</p> <p>Money Flashcards</p>	<p>For matching activities as well as basic memorization...</p> <p>Teaches time and money concepts (not just what the coins look like but also that 4 quarters is matched with 1 loonie).</p>
<p>Child's Clock</p>	<p>One that a child can move the hands with will help in understanding time concepts. The best kind has hands that move in coordination with each other so that when the child moves the minute hand around (clockwise), the hour hand automatically moves to the next hour. While you can make a cardboard clock with a split pin for fun, a purchased geared clock is much easier to use to teach time.</p>
<p>Thermometer (for math and science)</p>	<p>Use to illustrate indoor and outdoor differences, seasonal changes, day/night changes, and how to read the numbers accurately.</p>
<p>Plastic Beaker Set (metric)</p> <p>Standard Measuring Cups and Spoons (used in baking)</p>	<p>Measuring water, sand, rice, etc. accurately.</p> <p>Invite your child to use these “manipulatives” to measure your ingredients when you are preparing a meal, snack, or dessert.</p>

Long-Grain Rice (bag), Split Peas, or Dried Beans (e.g. soybeans, white beans, lentils)	Better for sand play/measurement inside a house since it is easier to clean up spills on the floor and little hands stay clean and dry. This idea was also used at the International Plowing Match in the educational play-area set up for young children.
Ruler --- Meter Stick ---Measuring Tape (Hint: Use a fabric measuring tape which is softer; avoid metal ones which scratch walls and are a safety hazard.) Bathroom scales	For measuring stuff around the house for fun or for math assignments... Measuring items accurately: - length, width, depth/height - weight comparisons At home, we made our own measuring tape for a math craft by sticking hockey stick tape onto paper and rolling it inside of a recycled box our son had painted. We marked a number line along it with black pen so that he could play "measuring things" with it.
Large-Button Calculator (cheaper than a toy cash register and often found at a dollar store)	For fun play with numbers (playing store, etc.)
Real or Plastic Coins (Using loose change - real cash - may be cheaper than buying a sets of plastic coins.)	Sort kinds of coins (identification). Figure out equivalent values of various coins (e.g. 100 pennies are the same value as 10 dimes). Count total amounts of a handful of money.
Muffin Trays, Food Containers Cookie Sheet or Cake Pan	Places to sort things into.
Toast or Pie or Homemade Pizza	Divide into fractions and eat!
Operations Flashcards (+, -, x, ÷)	Use for memorizing facts OR forget the idea of a timed drill and just use these for a display in a flashcard pocket chart. <u>Using flashcards as a display visual rather than as a flashcard is very helpful to a visual learner who doesn't care for the "flash" of a card but would rather stand and take the time studying something visually.</u>
Unifix Cubes (Usually a set includes 10 each of 10 colours)	Some people use these traditional 1" cubes to teach addition and subtraction. I think that other manipulatives mentioned above are more effective for teaching those concepts so we personally do not use them as often in our home but... these manipulatives can be helpful to measure things with (just count the number of blocks) and these can be also be used to build small patterns so that is what our family uses them for.
Shape Stickers or Construction Paper that is cut into small geometric shapes ahead of time	Make pictures that use only circles and ovals or only squares and rectangles but sticking them onto a piece of regular paper (with glue if construction paper shapes).

I've compiled these ideas for what to use for math manipulatives came from product descriptions, our family experience, my mom's teaching methods, some tips I picked up here and there and a few are based from lessons in the books [Hands-On Math – Manipulative Activities for the Classroom \(K-1\)](#) by Virginia Johnson (Creative Teaching Press, Inc., 1994. ISBN #1-574714236) and [Hands-On Math – Manipulative Activities for the Classroom \(Grades 2-3\)](#) by Glenda Nugent (Creative Teaching Press, Inc., 1995. ISBN # 1-574714244).

- Joy Delmore