

April 2013

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## Improving the Math Skills of Early Learners by Teresa Layden

**A Nation's Lackluster Performance:** For many years, the math performance of American elementary and high school students has been a controversial topic for parents, educators, policy makers, and business leaders. William Bennett (February 9, 2012) in a CNN opinion piece states: "Almost everyone, from educators to government officials to industry experts, laments the lackluster abilities and performance of our nations' students in science, technology, engineering and math (known as STEM education)."

Two indicators are particularly worrisome, especially as this country experiences greater global competition and high unemployment. American students score 23rd in math and 31st in science ([http://www.nytimes.com/2010/12/07/education/07education.html?\\_r=1&](http://www.nytimes.com/2010/12/07/education/07education.html?_r=1&)) when compared with 65 other top industrial countries. In math, we are beaten by countries from Lichtenstein and Slovakia to the Netherlands and Singapore. In science, we are beaten by countries from New Zealand and Estonia to Finland and Hungary.

For the United States, which led the way in space after Sputnik and showed the way in technological development and economic growth for the last 40 years, this is more than an embarrassment. And, for the future of our own GDP, economic well-being, and employer and employment needs, this is a disaster in the making. If the United States wishes to remain the most competitive and innovative country in the world -- never mind just another competitive and innovative country in the constellation of industrial nations -- this cannot stand.

As a report released this week from the President's Council of Advisors on Science and Technology found, "economic forecasts point to a need for producing, over the next decade, approximately 1 million more college graduates in STEM fields than expected under current assumptions."

Already, for many, the answer is to import the technological know-how that we need. There is nothing wrong with importing high-skilled labor and expanding visas and citizenship quotas for those needs we can't meet ourselves, but should we not be able to do a better job in growing and training our own citizens and students first?

**Bedtime Math** Bedtime Math is the brainchild of Laura Overdeck who studied to be an astrophysicist at Princeton and is now a stay at home mom. It is Overdeck's desire to change students' math performance by incorporating math into families' routines. In addition to reading bedtime stories to our children, she also wants parents to engage in daily math problems with them. Such math problems are provided free on her website and an app and book are in the works. "Alaska was the 49<sup>th</sup> state to join the U.S. How many states had already joined?" is one pre-k problem cited in the article. "If the griddletop can fit 4 pancakes, 3 eggs and 2 burgers, how many items are you cooking at the same time?" is another problem taken directly from Bedtime Math's website. In a recent *Time Magazine* article (February 25, 2013) the author confirms some of Bennett's observations and cites Sian Beilock, author of *Choke*. Beilock believes that the lag in U.S. students' scores might be in part cultural. As Beilock puts it, "You never hear people walking around bragging that they can't read...but you hear people all the time saying "I don't do numbers." Soon Beilock will research the effect of the Bedtime Math program on early learners.

**5 Key Areas** Obviously Bedtime Math is not the only answer to the ongoing crisis in students' math performance. Parents and educators can also provide many opportunities for children to develop competent, if not superior, math skills. The National Council of Teachers of Mathematics and the National Association of the Education of Young Children (NAEYC) have listed 5 key areas of mathematics they believe young students need to become well versed in:

- **Numbers:** Children learn about numbers by counting objects and discussing the results: "You gave Chris six goldfish crackers. How many does Susie need?" Children count spaces on board games. They count the days until their birthdays. The teacher might say, "Yesterday there were 12 days until your birthday. How many days are there now?" Preschoolers read counting books and recite nursery rhymes with numbers.
- **Geometry and spatial relations:** Children practice constructing shapes and discussing their properties. They see skinny triangles and fat triangles and upside-down triangles and gradually realize that they are all still triangles.
- **Measurement:** Children compare the height of a block tower with the height of a desk or table. They measure each other and the distance from the kitchen corner to the water table. They learn that this block is too short to make a bridge over the road. Teachers reinforce children's findings by asking questions and making observations: "I wonder if this block is long enough to bridge the road. Let's try it."
- **Patterns/geometry:** Children become aware of patterns in their clothes. They learn to recognize patterns of different colors and sizes in beads and blocks. They practice reproducing simple patterns by stringing beads and copying designs with colored blocks.
- **Analyzing data:** Children sort objects by color, size and shape; count them; and record the data on graphs and charts. These charts might reflect the class pet's growth, the number of rainy days in February, how many bean plants have sprouted, or the number of children with a birthday in March.

**Ways to Develop Math Skills at Home** From the website <http://www.greatschools.org/students/academic-skills/1135-what-to-expect-at-preschool-math.gs> comes this list of ways parents can help the development of math skills at home:

1. Show how math relates to daily life. Involve them in measuring ingredients when you cook or in figuring out if a container is big enough to hold their toy cars and trucks.
2. Play board games using dice or play money. Help your child count out the spaces to move his piece on the board. Play simple card games like Go Fish.
3. Count things at home and on the street: cars, books, toys, silverware. Count objects in book illustrations.
4. Call attention to different patterns and shapes: plaids, polka dots, paisleys, and triangular and rectangular shapes in the sidewalk.
5. Use terms such as above, beneath, level, larger, smaller, and equal, and words such as horizontal, vertical, perpendicular, and parallel, to describe things you see. You might ask your child to bring you the smallest cookie or to find the book beneath the large table in the living room.
6. Take your child to the supermarket with you and involve her in comparing prices.
7. When you balance your checkbook or pay bills, explain to your child what you are doing.
8. Take your child to the bank with you and let him watch you count money from the ATM.
9. Weigh and measure your child and make a chart to record her growth.
10. Buy a set of hardwood blocks for your children to build with (look for a secondhand one if new ones are too pricey). The educational benefits of blocks are unlimited; they will be one of the best investments you make.

**Suggested Ways to Help Children Develop Math Skills at School** There are also countless things we can encourage math at King Street. Here's just a sampling:

1. Estimate amounts (How many crackers do you think we can fit into this bowl?, if we line them up, how many blocks do you think it'll take to get from here to the door?, How far do you think you can throw this ball?, How many steps do you think it'll take to walk from here to the end of the gym—will the amount change if we run, will the amount change depending on the size of our feet?).
2. Count everything and anything--jumping jacks, sit-ups, how many times two children can throw a ball or balloon back and forth without dropping it. Count how many children are at the snack table. If one person leaves, how many will be left? Extend these activities. Ask how many jumping jacks they think they can do in one minute, two minutes and time them. Ask questions like these—if five people are eating snack how many plates do we need, how many cups, how many plates AND cups, how many plates and cups if two people don't want water... If plates come in packs of 5, and 6 children are here how many packs did we need to buy so we have enough? Or ask the children a question such as: "What are some things that come in sets of two?"
3. Count using one to one correspondence. Vary the amounts used depending on the age of the child. For very young children start with 3-5 items. Separate items and line them up so they can count them more accurately.

4. Measure things and make comparisons. Incorporate rulers or yardsticks in play. Also help them incorporate other measuring standards like unifix cubes, blocks or string. How many blocks do you think it would take to measure you from your head to your feet? (What if you use small blocks?, What if you use longer blocks?).
5. Build. How high can you build that stack of Legos? Can you build it to your knee, to your chest, to the top of the bookcase? Can you make a square, rectangle, triangle with those pieces? Can you make a castle with the soft blocks using every shape available or every size block available?
6. Use patterns. For instance, when children get discouraged and indicate they can't draw something, encourage them to draw and visualize what they're drawing with shapes—a circle for the head, an oval for the body, rectangles for the feet etc.
7. Use positional and other math related words and encourage children to use them as well. This is the fourth time this week it's rained, that's the third time I've heard you give your friend a compliment, this is the second time you've changed costumes... I see that you're on top of the play turtle, your friend is under it, and your other friend is alongside it. Would you like a square cracker or a rectangular one? Do you think that chair is heavier than you are? Do you think we can balance these books equally?
8. Encourage children to problem solve around math related issues and explain their reasoning. For instance, you might give a group of children a pile of buttons to sort. As they sort them according to various criteria--shapes, sizes, colors etc.-- have them explain their organizational system.

**Zeroing in on a Particular Area** The possibilities for math-related ideas at school are endless and each part of the school is ripe for activities. On the math blog <http://blog.mathatplay.org> I found the following posting dated March 3, 2013:

The art area is rich in opportunities for mathematics learning. Children explore size, shape, and spatial relationships as they use three-dimensional materials for sculpting and collage. They describe patterns in wallpaper samples and create patterns with stencils or paint and sponges. Representation, which is basic to art, is also fundamental to mathematics, which relies on symbols to represent concepts...Your primary role in the Art area is to facilitate children's art explorations and creations. By observing children and listening to them talk about their work, teachers can decide whether and when to call children's attention to mathematical concepts.

~Copley, Juanita V., Jones, Candy, and Dighe, Judith, [\*The Creative Curriculum for Preschool, Volume 4: Mathematics\*](#), Teaching Strategies, 2010

This was followed by a list of items used in an art area that can be linked to math concepts:

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|---|---|--|---|
| • <a href="#">picture books about colors, shapes, math and art concepts</a>                       | • <a href="#">buttons, pom poms, craft feathers,</a>              | • <a href="#">patterned paint rollers</a>          | • <a href="#">stampers, stamp pads)</a>   |
| • <a href="#">number and shape stencils</a>   | • a variety of <a href="#">paper</a> cut into a variety of shapes | • <a href="#">thick and thin crayons</a>           | • construction materials (cardboard, bottle caps, styrofoam packing peanuts, bubble wrap) |
| • <a href="#">shape sponges</a>   | • <a href="#">glue</a>  | • <a href="#">thick and thin markers</a>           | • recyclables (boxes, cardboard tubes, cone-shaped cups, plastic containers, foam trays)  |
| • <a href="#">felt, fabric and wallpaper samples</a>  | • <a href="#">craft tape</a>                                      | • shape and numeral <a href="#">cookie cutters</a> |   |
| • collage materials like <a href="#">flowers, foam shapes</a> and <a href="#">textured shapes</a> | • <a href="#">Rulers</a>  | • <a href="#">dough and dough tools</a>            |   |
|   | • <a href="#">craft sticks</a>                                    | • printmaking materials (corks,                    |   |
|   | • <a href="#">pipe cleaners</a>                                   |  |   |
|   | • <a href="#">washable paint</a>                                  |  |   |
|   | • <a href="#">paint brushes</a> in two or more widths             |  |   |

Without a doubt, the more we think about math in the context of students' school experiences, the more we can integrate math ideas into their learning.

**Remember—Have Fun!** As with many aspects of early learning, math concepts are often best reinforced and internalized in the context of play. So remember, make it fun—go on a number or shape safari (1 teacher, 2 cubes for the slide...) or count the wheels on a space hero's rocket ship. The lessons learned won't seem like lessons at all, but rather like meaningful parts of one's everyday experience.

## What Should We Eat Today?

For many children, eating is a high point of the preschool day. School provides a variety of experiences for our children, including the introduction of new foods. Often a child will try an unfamiliar food when other children are eating it or have brought it to share from home. Kids develop table manners and self-help skills (such as identifying their own hunger) in a natural setting.



**Please be aware of children's allergies and diet restrictions—posted on the refrigerator in the kitchen and on our Yahoo Group.** Avoid foods listed or provide similar alternatives for children with allergies or restrictions. Please contact the parent of the child with food restrictions for ideas if needed.

**Emphasize nutrition!** Avoid artificial flavors, colors, additives, and preservatives. Serve organic when possible. Conventional produce is preferred over processed food. Limit salt and sugar when possible. No treats please unless there is a special occasion.

- ✓ Please be extra watchful and check in with parents of plus ones if easily aspirated/choking hazard foods such as whole grapes, nuts, large chunks of raw vegetables, seeds, or popcorn are brought in.
- ✓ Allow children to spread, mix, pour, or peel for themselves when possible!

### Snack Menus Ideas: Pick a Fruit, Vegetable, Protein, Whole Grain for Snack

- Apples, Carrots, rice cakes and nut butter
- Bananas, frozen peas and carrots (cooked :)), GF noodles and cheese
- Wheat and Corn tortillas (for GF option), vegetarian refried beans or sautéed chicken or black beans, with shredded cheese, sweet peppers, avocado, tomatoes, lettuce
- Brown rice, Chicken nuggets (pound of chicken cut up, garlic and herb seasoned, fried in olive oil), Edamame (vegetarian protein option), Mandarin orange slices, Red pepper slices
- Quinoa pasta tossed with olive oil, garlic salt, pinch of herb seasoning (Toss with garbanzo beans as dairy free, vegetarian protein option), String cheese sticks (vegetarian protein), salami (popular), grapes (fruit), broccoli
- quesadillas (GF, palm oil free corn tortillas, shredded cheese) fried without oil, guacamole, carrots, cut up chicken sausage
- mini pizzas – bread thins, pizza sauce, veggies, meats, cheese
- parfaits – granola, yogurt, fruit
- chili & cornbread, simple salad
- blueberry pancakes, bacon, oranges
- Hummus, feta cheese, red peppers, tomatoes, carrots, grapes
- Sea weed snacks, tofu, buckwheat noodles (GF) tossed in peanut sauce (GF), oranges
- Build your own trail mix: bowls of nuts, seeds, dried fruit, and high fiber/protein cereals
- Tortilla turkey cream cheese roll-ups (use rice tortillas for those with allergies, or just meat and cheese roll up), orange slices and carrots
- Smoothies (yogurt, frozen berries, frozen mango, banana, OJ and water) with mini bagels (or millet toast and cream cheese (Bring blender from home or check school for one)
- Cereal with milk and bananas (w/ GF option)
- Sautéed chicken sausage slices, rice pasta, sweet peppers and apples
- Scrambled eggs, toast (w/GF), cuties and broccoli
- Peanut butter banana toast (with gf bread option) - kids could slice bananas and spread PB
- Popcorn (air popped or stove top, no salt or butter)
- Grapes
- Cheese
- Nuts
- Pears
- Dried fruits - apricots, raisins, peaches, etc (watch for added sugar)

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BIRTHDAY!

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Columbia City Bakery	Geraldine's Counter	Northwest African American Museum	Schwartz Brothers Restaurants
	Gymboree		Seafair



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Your contributions to the King Street newsletter are always welcome. The next edition will come out on Tuesday, May 14th, 2013. Please send articles and info to Lissa Munger, [ecmunger@gmail.com](mailto:ecmunger@gmail.com), by Thursday, May 9<sup>th</sup>.