Early Bloom – Early Rot?

Challenging Young, Talented Readers

Serving Pre-K – 2 Gifted Learners
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Serving Pre-K—2 Gifted Learners

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GIFTED EDUCATION COMMUNICATOR WINTER 2007
Many—probably most—public school programs for gifted learners do not start serving the children until they reach 3rd or 4th grade. Two primary reasons are typically given:

- It is too difficult to accurately identify young students.
- Funds are too limited to cover the entire span of grades.

A further argument often cited is that at this age, parents and teachers ought to focus on the socialization of children rather than intellectual activity.

This issue of Gifted Education Communicator explores relevant concerns regarding service to young gifted learners during the years four-to-seven. Nancy Robinson starts us out with her article, “Early Bloom/Early Rot: Putting an End to an Old Myth.” She discusses the reality of what it means to be gifted at a young age, ways to identify young learners, and the harm that can result from doing too little at an early age.

Elizabeth Fogarty and Sally Reis address the topic of reading and young gifted children, an issue high on the list of concerns of both parents and teachers. In their article, “When ‘Mrs. Wishy Washy’ is Wrung Out: Challenging Young Readers,” they note that “Developmentally appropriate practice…is situational and must be redefined for young, talented readers.” They include many suggestions for support of and challenge to these young readers.

Two articles focus especially on classroom activities for young gifted learners. In her article, “Arts Alive: Higher Level Learning for Young Gifted Learners,” Joan Franklin Smutny points out that visual and performing arts enhances the cognitive learning of children, especially through nurturing creativity. She includes recommendations for creating a learning environment as well as applying the arts to learning goals that can build on the individual strengths of learners.

Fred Estes shares a lively description of the method he and his teaching partner have developed in “Inquiry Science for Young Gifted Students: The Pleasure of Finding Things Out.” His description of letting the kids lead in the design of science units is noteworthy; the children were escorted on a walk in the woods while teachers observed what most captured the interest of the children. Two of their most noteworthy results were units on banana slugs and the formation of slime.

Of special interest is the method used for creating a science unit including several phases:

- design and create
- modularizing
- compacting
- independent studies
- teaching great lessons

Estes reports that, “Children always have more questions and the world provides science with a never-ending supply of new puzzles to solve.” You are encouraged to try your hand at supplying the puzzles.

Nancy Hertzog and Laura Belchenko focus on the critical role of home environment in supporting young learners as well as best practices in early gifted education. These are spelled out in their article, “Contexts for Early Childhood Gifted.”

As always, our regular columnists have much for you to ponder as well. I would like to draw your attention to three of them.

In “The Inner Game: Psychological Preparedness,” Maureen Neihart has been examining a number of physiological impacts on ability for high achievement, including the significance of protein in brain mood management and the impact of caffeine on achievement. This time she discusses the role of sleep. She notes that “…there seems to be a direct connection between sleep and structural changes in our brains.” She follows with specific recommendations to assist in ensuring sufficient sleep for high achievement.

In the “Student Voices” department, you will find the story of a remarkable young woman who accomplished the extraordinary feat of turning a rejection of admission to her chosen school, the University of Southern California, into acceptance and personal fulfillment of a long-held dream.

In the “Hands-on Curriculum” department, Ann MacDonald and Jim Riley present us with an intriguing lesson on the concept of zero in an article entitled, “Much Ado About Nothing.” Among other activities, they demonstrate how to “visualize nothing.”

The volunteer editors of Gifted Education Communicator hope your holidays were very pleasant and that the new year brings you increased opportunities and satisfaction in your efforts to support gifted learners.

We will be back in the spring with a groundbreaking issue focused on “Understanding and Applying Brain Research in Gifted Education. Dr. Barbara Clark, our advising editor, will be guest editor, and the issue promises to be one of significance in our field.

—Margaret Gosfield, Editor
C A L E N D A R  O F  C O N F E R E N C E S

2008

JANUARY 31–FEBRUARY 2, 2008
Utah Association for Gifted Children
Sheraton Centre, Salt Lake City, UT
uagc.org

FEBRUARY 6–8, 2008
Arizona Association for Gifted and Talented
Black Canyon Conference Center, Phoenix, AZ
arizonagifted.org

FEBRUARY 11–12, 2008
Indiana Association for the Gifted
The Adams Mark Airport, Indianapolis, IN
iag-online.org

FEBRUARY 15–17, 2008
California Association for the Gifted
Anaheim Marriott Hotel, Anaheim Convention Center, Anaheim, CA
cagifted.org

FEBRUARY 19–22, 2008
Arkansas Association for Gifted and Talented
Peabody Hotel & Convention Center, Little Rock, AR
agate-arkansas.org

FEBRUARY 21–22, 2008
Kentucky Association for Gifted Education
Marriott Griffin Gate Hotel, Lexington, KY
wku.edu/kage/

FEBRUARY 22, 2008
Oklahoma Association of Gifted, Creative, & Talented
University of Central Oklahoma, Edmond, OK
oagct.org

FEBRUARY 29–MARCH 1, 2008
New Jersey Association for Gifted Children
The Westin Princeton, Forrestal Village, NJ
njagc.org

MARCH 5–7, 2008
National Curriculum Network Conference
The College of William and Mary, Williamsburg, VA
ecfe.wm.edu/professional_ncnc.htm

MARCH 6–9, 2008
Best Practices Institute
The University of Virginia Curry School of Education, Charlottesville, VA
curry.edschool.virginia.edu

MARCH 15–16, 2008
Queensland Association for Gifted and Talented Children
Queensland Academy for Science, Mathematics and Technology, Toowong, Brisbane, AU
qagtc.org.au

MARCH 17–18, 2008
Georgia Association for Gifted Children
Georgia Tech Hotel, Atlanta, GA
gage.org

MARCH 19–21, 2008
North Carolina Association of Gifted & Talented
Marriott Hotel, Winston-Salem, NC
ncagt.org

APRIL 2–5, 2008
Council for Exceptional Children
Hynes Convention Center, Boston, MA
cec.sped.org

APRIL 14–15, 2008
Ohio Association for Gifted Children
Columbus, OH
oagc.com

APRIL 17–19, 2008
Pennsylvania Association for Gifted Education
Harrisburg Hilton Towers, Harrisburg, PA
penngifted.org

MAY 2–4, 2008
Beyond IQ (BIO) Boston
Chelmsford, MA
giftedconferenceplanners.org

MAY 18–20, 2008
Wallace National Research Symposium on Talent Development
University of Iowa, Iowa City, IA
education.uiowa.edu/belinblank

JUNE 17–22, 2008
Autonomous Learner Model
Estes Park Center, Estes Park, CO
http://www.alpspublishing.com/

JULY 7–18, 2008
Confratute 2008
University of Connecticut, Storrs
gifted.uconn.edu/confratute/

JULY 9–11, 2008
Australian Association for the Education of Gifted and Talented
Hotel Grand Chancellor, Hobart, Tasmania, Australia
giftedconference.org.au/

JULY 18–20, 2008
SENG (Supporting Emotional Needs of the Gifted)
Salt Lake City, UT
sengifted.org

October 29–November 2, 2008
National Association for Gifted Children
Tampa, FL
nagc.org

If your organization has a state or national event planned, please contact Ann MacDonald at: clanmacd@mac.com to list your information
Adrienne Hall has been a super-hero fan since childhood. She enthusiastically describes her involvement: “At night I prayed, hoped, and wished on stars that some radioactive spider would come along and bite me—that some day I would wake up and realize that I could walk through walls, fly across skies, and single-handedly change the world. I had this comic book notion that the only way to make a difference was to have some large scale nuclear disaster transform me into a super human—a super hero.” Like her favorite super hero Batman—a regular person with a hidden personality who made the world better—Adrienne could always keep hope with an inner life even when the outside life presented challenges.

Indeed, life presented those challenges. From the beginning, teachers always recognized Adrienne’s advanced abilities. She remembers Ms Evjens and Ms Kim who took her to see The Nutcracker, eat at the Hilton Hotel, and tricked her into eating squid! She reminisces: “Events like this showed me that there was more out there beyond the gates of Springdale Apartment Complex where I spent most of my childhood, and I was introduced to the duality of life as a gifted student in a not-so-gifted world.”

Adrienne has a wonderful—a poetic grasp of who she is. She expresses it in this manner: “Everyone has a story, and I don’t want to tell the same story about how I grew up poor and how, because I’m Black, I had it harder than everyone else. I want to tell the story of a girl who was made in two opposing parts and struggled because they never matched.” You can see now how Batman and other super heroes were so appealing.

Everything was normal in elementary and middle school because she went to school with neighborhood kids, she had what all the other kids had, and she never realized she had less than others. However, the day came. It was inevitable. Her eighth grade pre-algebra teacher convinced her to apply to Long Beach Polytechnic High School’s magnate Program of Additional Curricular Experiences (PACE) program on the other side of the city.

After being accepted to the PACE program—a very difficult achievement—she was confronted with “what felt like boulders rolling down mountains.”

Adrienne tells this story with animation: “I received a letter from my ninth grade English teacher with the assignment to read Cry the Beloved Country and Things Fall Apart and to write three essays on each before school started. I felt I was learning to read all over again; for the first time in years I was unable to comprehend. I would read the lines over and over until my head hurt from confusion and frustration. The books that I had been reading were not at all as sophisticated as the ones I would be assigned in the upcoming year.

“I had to wake up at 5:00 am every morning to catch two city buses that ran once every 40 minutes. It was a matter of either being extremely early or getting to school late and sitting in class with the kids from the suburbs, not the neighborhood. You were a loser if you ate free lunch; everywhere you went it was product placement from the backpacks to the tennis shoes, and in most of my classes I was the only one who looked like me.”

With great respect and tenderness, Adrienne tells stories about the sacrifices her family made for her as she was experiencing this new environment. “My granny kept a bed at her house for me because she lived across the street from my high school, so when I was up all night reading chapters and writing outlines for AP U.S. History, I didn’t have to wake up at 5:00 a.m. or 4:00 a.m. when there were review sessions.” There are stories of her whole family sacrificing to buy school and other essential supplies. There are stories of how many different jobs she held to earn money. When you are young, these sacrifices are real, and they are painful. When you are older, these are the “when I was young” stories that you tell with pride.

By her senior year, Adrienne was on equal ground with the other PACE students. This was no easy feat because she had to do catch-up learning simultaneously with new learning. It was truly a super-hero performance. She set her heart on attending the University of Southern California to become the first-generation college student in her family. Her success is also a tribute to her family’s contributions and sacrifices.

Adrienne Hall is an inspiration and an example for those who follow. That is what a super hero is... in our fantasies as well as in our realities. ■

Adrienne Hall was born and raised in Long Beach, CA. She is a graduate of Long Beach Polytechnic High School’s Magnet PACE Program. She is now a senior at the University of Southern California. This spring she will graduate with a BS in Business Administration with an Entrepreneurship and Finance Concentration and a minor in Music Industry. After graduation she plans to pursue a Master’s Degree in Public Policy/Public Administration and then work for a non-profit or government agency.
A Dream Deferred

A Dream Fulfilled*

* Editor's note: Disappointment is part of life's realities—for everyone. Certainly being denied acceptance to a major university is a universal reality for most applicants. However, for the most imaginative, finding a unique way to stand strong, persevere, and reapply can bring about unexpected acceptance. Adrienne Hall dealt with the denial of her application to the University of Southern California by writing the letter below. The university, in turn, reversed its original decision.

When I was young, I could recite this poem forward or backward at the drop of a dime. The works of Langston Hughes intrigued me, as each one seemed to be speaking to me directly.

I soon forgot the words to my favorite poem. But four years later, on April 1, 2004, I found myself right back to square one, contemplating what happens to a dream deferred. I was beyond being shocked, sad, and de-pressed—the normal emotions associated with rejection from one's chosen university; I felt moribund. I had taken all the right tests, immersed myself in all the extra-curricular activities and volunteer work, sent in all the scores, transcripts, and recommendations before the earliest deadline.

I even wrote the most profound essay I had ever written in my life. What more could I give you? And after days of tears—"It wasn't meant to be's," "What about plan B's?" and "They don't know what they're missin's"—I found a way. No matter what life's failings or backward at the drop of a dime. The works of Langston Hughes intrigued me, as each one seemed to be speaking to me directly.

So when the important decision of choosing a career and furthering my education became necessary, I reacted similarly. I realized that if I followed specific instructions, I was guaranteed the perfect outcome. It was OK to spend summer vacations taking college prep courses while everyone else went to pool parties; it was OK to spend weekends either volunteering or taking tests; it was OK to struggle with school work and cheer practice. It was OK and expected of me to sacrifice these years of social pleasures in search of something better for the future.

Therefore, on April 1, 2004, you can only imagine my disappointment. I felt all those years had been lived in vain...My life had become a failed algorithm—a dream deferred if you wish. I promised myself that I would never again allow myself to be so vulnerable and inevitably heartbroken. I would settle for the next best and be happy.

So why am I appealing this decision? Why am I once again setting myself up for possible disappointment? The truth is I cannot and will not settle. I believe that the University of Southern California is where my next transition lies—where I can stop being a dreamer and start being a doer. I want to be more than just a dreamer; I want to be more than just a statistic. I want to be more than just another number 8923478, one among thousands seeking to be a part of the University of Southern California's Trojan pride. So I would like to take this opportunity to offer some information previously unreported and untold...in a unique way.

MY LIFE AS AN ALGORITHM

I could start with some familiar facts including that I was born at St Mary's Hospital in Long Beach, CA on May 2, 1986 and how happy my parents were to see me. But I would rather start from the birth of Adrienne, as we know her now.

I believe it was the summer before the seventh grade. Like most thirteen-year-old girls, I was a dreamer. I searched and prayed for some Hollywood-scale miracle, or catastrophe even, to rain some excitement into my seemingly dull and unbearably mediocre life. All of my childish dreams and desires focused on the necessity of obtaining a driver's license. The mediocrity of my life then didn't seem to matter; the freedom of the open road at age sixteen would more than compensate. And from that point on, I no longer lived my life in the present; I lived for the future.

So why am I appealing this decision? Why am I once again setting myself up for possible disappointment? The truth is I cannot and will not settle. I believe that the University of Southern California is where my next transition lies—where I am destined to study Business Administration and explore the arts of music, creative writing, film, and western philosophy. My dream cannot dry up, sag, or explode; it must bloom into a magnificent flower and remain persistent, steadfast, and stubborn in the face of rejection and will not accept no for an answer.

Respectfully,
Adrienne Hall
Preparing for High Achievement
Rest is a Discipline

Are your students among the perpetually under-rested? As many as 85% of adolescents and 71% of adults do not get enough sleep. What difference does sleep make for performance and achievement? If students have an important test or a high stakes audition, is it better to stay up late cramming or rehearsing, or are they better off getting to bed early?

Your students may be interested to know that sleep helps us remember what we have learned. Robert Stickgold, a professor of psychiatry at Harvard Medical School, says that sleep-deprived students do not remember new skills they’ve learned as well as do students who get enough sleep. In fact, evidence for sleep’s benefit for what is called procedural memory is much stronger than for what is called declarative memory.

Declarative memory is memory of facts, like dates of historical events; procedural memory is memory for motor or perceptual skills like driving a car or playing a sport. Late night cramming may be justified for some kinds of tests, but not for others. If you just have to regurgitate facts, it might be worthwhile to lose some sleep in order to memorize them, but if you’re going to have to synthesize some big ideas and write an essay under time pressure, you may be better off getting more sleep. Some researchers disagree, however, and say it’s too early to adopt these ideas as facts because there are too many questions that the theories fail to answer.

Highly motivated students push hard mentally and physically, often without sufficient rest. Without recovery routines, they are more vulnerable to frustration, anxiety, and loss of concentration, and they are more likely to choke under pressure. The real enemy of high performance is not stress, but the absence of disciplined recovery. Erratic energy levels, difficulty concentrating, and wide mood swings are the result when there is an absence of energy recovery routines. Every achiever must learn to create a balance between stress and recovery by discovering the routines and rituals that quiet their minds and improve their focus. They may be more willing to do this if they understand what sleep does for their brain.

Sleep is essential for brain repair. Indeed, sleep may be more important for restoring the mind than it is for resting the body. Sleep restores the levels of an enzyme called superoxide dismutase (SOD) in the brain. This enzyme is essential for repairing the damage caused by oxidative stress. Sleep also seems to replenish the energy our cells need to work while we are awake. Our muscles can rest any time we are still, but the only time the brain really rests is when we sleep.

More importantly, there seems to be a direct connection between sleep and structural changes in our brains. Scientists used to think that we were born with all the nerve cells we were ever going to have, but now we know that the brain grows new cells. Some studies suggest that sleep may actually help the brain create new nerve cells, and recent studies suggest that not getting enough sleep inhibits the growth of new cells.

There do seem to be ways to make up for lost sleep. Taking a 30-60 minute nap between noon and 3pm and avoiding oversleeping on the weekend help. In addition, many people find they can get more sleep if they follow these suggestions from sleep researchers:

• Avoid late night snacks — digestion prevents good rest
• Don’t oversleep on weekends; it can disrupt your natural sleep rhythms
• Turn off the TV or video an hour before sleeping; reducing stimulation helps your brain to relax

Mastering rest and recovery routines enables students to perform at higher levels while spending energy for fewer hours. It also helps them maintain their passion and avoid stagnation. In addition, it improves cognitive capacity. You may know gifted students who claim that they can get by on six hours of sleep or less. While it is true that such people exist, the truth is that most people need eight hours to be at the top of their game. When it comes to high performance, elite achievers are religious about rest. For them, rest is a discipline.

RESOURCES

MAUREEN NEIHART, Psy.D., is a child psychologist and former teacher and school counselor from Montana. She is Associate Professor of Psychological Studies at the National Institute of Education in Singapore.
ADMINISTRATOR TALK
By Carolyn R. Cooper

Stretching Young Gifted Children’s Abilities

The Tiger Woods Approach

Two kindergarten teachers are discussing the likelihood of giftedness in very young children. “Sure, some of them seem gifted. They’ve been in nursery school since they were two!” exclaims Teacher A who doesn’t believe preschoolers or even kindergartners can exhibit giftedness at so early an age. “They’re not gifted; they’re just ‘school wise.’ The other kids will catch up to them before long.” Teacher B disagrees. “Gifted children think, feel, and learn differently from others—whatever their age—so we need to apply best practice here and teach them accordingly,” she states emphatically. For instance, do you think that limiting Tiger Woods, at age five, to attempt only age-appropriate golf shots would have been best practice for him?

As many administrators will admit, early giftedness has been a controversial issue for years. While young children with unusual aptitude in sports, music, and other arts have been accelerated without hesitation, youngsters with exceptional academic abilities have not. What’s more, they have been trapped in education’s lock-step system of completing each and every grade sequentially, needlessly repeating material they knew before they ever entered a school setting. Put simply, many of our most capable young learners are discriminated against because they are smart! What does this say about how our schools value human capital?

Then, along comes No Child Left Behind which punishes these bright youngsters even more. Because they can learn very quickly or, in many cases, already know their grade-level curriculum content, these children are merely marking time in the classroom instead of using their advanced aptitudes productively. We know seat time doesn’t equate with learning, but placement in an appropriately challenging setting certainly can.

NEW EXPERIENCES, NEW SKILLS

“Early education for the whole child cannot be reduced to teaching facts and skills,” asserts Mary Ellen Freeley, a recent past president of the Association for Supervision and Curriculum Development (ASCD; Education Update, August 2007, p.2). “The goals of early childhood education should include helping children to make decisions, solve problems, and get along with others.” Since young children showing signs of giftedness often use these skills already, they need a qualitatively different set of learning experiences that will teach them new skills commensurate with their abilities. Very bright youngsters need environmental stimulation through curricular enrichment, encouragement, and the support of knowledgeable, well-trained teachers who understand them.

Meet Josh. Strong-willed, intensely curious, and tenaciously persistent, Josh loves to learn. He’s thrilled with the 100-book challenge his kindergarten teacher has assigned; a fluent reader, he is confident he’ll meet this challenge easily. Josh is eagerly anticipating math, too, but, since he already knows how to add and subtract single-digit numbers, his math curriculum must be advanced beyond the standard kindergarten content. But “advanced” doesn’t mean giving Josh more work at the same level; a “more of the same” approach is without question the worst strategy for gifted students at any age! In fact, children learn quickly to hide their talents to prevent being assigned more of the same mind-numbing exercises! Dr. Jerome Bruner, a pre-eminent voice in the shaping of education, stated, “Any subject can be taught effectively in some intellectually honest form to any child at any stage of development” (The Process of Education, 1960). So, what are the qualitatively different learning experiences that will teach Josh and other young gifted children new skills commensurate with their abilities?

STRETCHING CHILDREN’S STRENGTHS DEFENSIBLY

For children exhibiting signs of giftedness very early, teachers must nurture their strengths by stretching—not pushing—their capacity to learn to a level that’s just a little uncomfortable for them. They know so much already that if we don’t stretch them into new territory, they’ll simply wallow in their comfort zone and not advance commensurate with their true potential. For example, we administrators hear about high-scoring graduates who, having cruised effortlessly through high school, hit the wall of college expectations so hard it knocked them out—out of college, that is. Behavior problems, too, occur frequently in high-ability youngsters if they are not accelerated appropriately when they need to be (Baum, Cooper, & Neu, in A Nation Deceived, Vol. II, 2004; p. 111).

Critics of acceleration often fail to distinguish between advancing gifted students for their own intellectual growth and feeding them isolated facts, an undeniably senseless practice wherever it occurs. “Kindergarten has become the new first grade,” says Kathy Hirsh-Pasek, a Temple University psychology professor who authored Einstein Never Used Flashcards. “We’re so afraid that if we don’t shove in facts, the children will fall forever behind . . .” (Baltimore Sun, August 26, 2007). Recommending that we stretch our bright young children like Josh is not to say we force-feed them facts. Advancing our young gifted children must be done defensibly.

Defensible acceleration of bright young children must include
time for both academic advancement and play, integral to a child's physical, social, and intellectual development. Play is far more important and complex than we may realize. In his seminal article, “The Importance of Play” (The Atlantic Monthly, March 1987), Bruno Bettelheim, eminent child psychiatrist, cited Freud's view of play as “the means by which the child accomplishes his first great cultural and psychological achievements; through play he expresses himself” (p. 35). Bettelheim himself credited play as a valuable means of coping with home problems and other concerns. He observed that “Play teaches the child, without his being aware of it, the habits most needed for intellectual growth, such as stick-to-itiveness, so important to all learning” (p. 36). Above all, he maintained, children need room to play—“to move not only one's elbows but also one's mind, to experiment with things and ideas at one's leisure . . . to toy with ideas” (p. 37).

AN ENABLING CURRICULUM: INQUIRY, DISCOVERY, AND PROBLEM SOLVING

The basic skills and direct instruction emphasis in today's schools cheats many young students out of the enriching topics that teach a child to use inquiry, discovery, and problem solving—elements essential to bright children's cognitive development.

Past president of the National Association for Gifted Children (NAGC), Dr. Barbara Clark reminds us that exceptionally bright youngsters ask frequent and sophisticated questions, are complex thinkers, connect seemingly disparate ideas, and are persistent in pursuing their own interests (Parenting for High Potential, March 1997, p. 9). They require inquiry-based learning that—through questioning techniques—stimulates students to look beyond the surface of what they are learning. This is a modern-day application of the Chinese proverb, “Tell me and I forget, show me and I remember, involve me and I understand,” shared with parents by Dr. Robin Schader, NAGC's Parent Resource Specialist (Parenting for High Potential, May 2005, p. 17).

In Nurturing the Gifts and Talents of Primary Grade Students, Dr. Susan Baum, specialist in primary-level gifted education, recommends a four-pronged “enabling curriculum” for our young gifted children.

1. Challenging, developmentally appropriate activities (Teachers explain abstract ideas in concrete terms rather than postponing those ideas until the children are older. See Bruner quote above.)
2. Content-rich environments of sophisticated intellectual challenges (Children link the major ideas, concepts, and principles of one discipline to others with similar elements.)
3. Active learning processes by which youngsters use inquiry, discovery, and problem solving (Children draw conclusions and substantiate them with defensible reasoning, higher-level thinking skills that stimulate their creative ideas, and the resulting production of new knowledge.)
4. An organic curriculum that allows experiences to evolve in response to children's interests and enthusiasm. (An enabling curriculum is never static.)

Baum maintains that although “teachers often light a spark in children, [they] may forget [their] equal responsibility to nurture the flame” (1998, p.165). An enabling curriculum of these four components and facilitated by a highly-skilled, experienced teacher of gifted young children builds a strong launching pad from which our bright youngsters can soar.

TIPS FOR ADMINISTRATORS

We administrators need to take a lesson from the Tiger Woods experience of matching talent and opportunity. Implementing an enriched curriculum should enable our bright youngsters to apply their advanced talents to new opportunities for stimulating their intellectual growth and development. The skills of (safe) experimenting, taking risks, hypothesizing, and comparing outcomes with predictions are as critical as the content-specific skills they learn. Inquiry, discovery, and problem-solving skills span all disciplines and prepare these bright children for lifelong learning.

The following tips may help you get started.

- Review your early childhood staff’s professional credentials. Do they have specific experience with teaching gifted children?
- Arrange collaborative professional development with another school or district to keep all PreK-2 staff knowledgeable about teaching young gifted children.
- Examine your PreK-2 curriculum. How enriching is it? In what ways do gifted children apply their abilities to stimulating intellectual challenges?
- Determine how responsive the PreK-2 curriculum is to children's interests and enthusiasm.
- Contact the National Association for Gifted Children, nagc.org, for information about its Early Childhood Division’s current efforts.

RESOURCES


Early Childhood Division. National Association for Gifted Children. 1707 L Street, Suite 550, Washington, DC 20036; www.nagc.org


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The “wisdom” in far too many school settings is that no matter how bright children seem to be as they enter preschool and the primary grades, they can fool you: their apparent ability may be unstable, lacking staying power. Moreover, their advancement may be their parents’ fault for teaching them “too much and too fast.” (Wouldn’t it be a good idea to inquire just how parents magically accomplish this effective teaching of basically non-talented kids so the feat could be replicated by teachers who are under the gun to leave no child behind?) And anyway, it is said, what these children need most is to learn to socialize with age peers—even though they do not share interests, vocabulary, or learning pace with their classmates.

Early Bloom—Early Rot?
Putting an End to an Old Myth
By Nancy M. Robinson
These false assumptions can be highly detrimental to the welfare of gifted children. Bright children enter the system eager to learn and well prepared to do so, but are seldom given appropriate provisions given until third or fourth grade, if then—sometimes too late to undo the damage of the early years.

Research about gifted children reveals that generally they are as socially, emotionally, and intellectually as robust as other children so long as their environments are calibrated to their social, emotional, and intellectual development. Socially, they thrive in the company of true peers—peers who not only “speak their language” but also share their maturity of interests. They need peers who understand friendship in their terms—a relationship that is stable (not a new best friend every day), intimate, and loyal. And, like other children, they need a challenging educational environment that is calibrated to the level and pace of their learning. Granted that their social skills and their ability to regulate their emotions may not have kept pace with their intellectual growth, on average, gifted children are more mature in these respects than other children their age.

Because no two gifted children are exactly the same, schools need to provide more than one option. Settings in which children are provided with age peers who are also intellectual peers are ideal, but some children will have markedly uneven advancement across domains, some will be socially much more mature than others, and some children are mildly advanced while others are “off scale.” Various kinds of placement options, approximations, and accommodations can keep bright children progressing, happy, motivated, and self-confident; but they need to be selected in a thoughtful way.

WHAT DOES IT MEAN TO BE GIFTED AT THIS AGE?

The age span of four-to-seven years is typically a period of rapid cognitive growth for all children. There are several different, complementary ways we can think about their development. Sometimes one way is more useful than another, depending on the focus of the moment.

Speed of learning. Gifted children learn faster than others. Our basic definition of advancement is that children have accomplished developmental tasks and met milestones at earlier ages than other children—that is, that they have developed at a faster pace. Indeed, it is because gifted students generally catch on the first time that they are so bored, bored, bored in school.

Mental age. By developing more quickly, gifted children resemble older children in their thinking. Because they are advanced in mental age, the problems they are able to solve are like those at which older children typically succeed, problems that require depth and complexity of thinking that is beyond the ken of most children their own age.

Stage acceleration. Some theories, the most popular being that of Jean Piaget, emphasize stair-steps representing profound changes not only in what children know, but in the basic ways they reason and the frameworks by which they understand the world. The biggest step in this age era, in Piagetian terms, is between the preschool “pre-operational stage” in which bits and pieces of understandings are achieved and the “stage of concrete operations” during which systematic thinking emerges and understandings are linked in logical and coherent ways. It is this transition that makes it possible for children to master reading, writing, and spelling, all of which rely on systems and symbols. If children don’t intuitively have a feel for the number system, they cannot “get math.” Unless the way words are constructed is grasped as predictable and systematic, the phonemic basis of reading and spelling are totally confusing. Gifted children transition these stages at somewhat earlier ages than do their age peers and once having grasped the ideas, master and generalize them more efficiently. More about this later.

Differentiation. There is some evidence that gifted children tend to develop unevenly, to be faster in some domains than others—the domains differing among children. In studies we will describe later, we found toddlers whose language was more accelerated than their ability to build with blocks; we also found older preschoolers who were better at math than other things, although they tended to be somewhat advanced across the board. Typically developing children tend to be more even in their abilities.

Qualitative differences in thinking. This is an open question about which the evidence is not yet in. Can we explain apparent differences between gifted children and others by some special quality of thinking, or do they just look like older children, creating the illusion of qualitative differences? We frankly don’t have complete answers to this question.

In addition to the unexpectedly early specific skills they show, what do bright young children look like? How can we spot them? Here are some clues, though not every bright child will show all of them:

• impressive memory—long-term as well as short-term
• early language (though some don’t speak early), complex sentences, and unexpected words
• precocious mastery of symbol systems in reading and math
• early questions, intense curiosity, early passions and wanting to know “everything” about some things
• fears and world concerns like those of older children (but often not the emotional maturity to handle them well)
• early appreciation of humor and puns
• vivid imagination in stories, pictures, or songs
• complex play ideas that baffle their peers
• preference for the company of older children (or younger ones willing to do their bidding) and seeking more mature friendships
• if all is going well, a love of challenge, a sense of zest in tackling the difficult (If it’s not, they may prefer to take the easy way and “melt-down” when they can’t master something right away.)
• developmental asynchronies that can produce frustration
and emotional outbursts
• differences in reasoning ability across domains (e.g., early reading but not math or vice versa; terrific puzzle-solving but ordinary verbal skills or vice versa)
• differences between intellectual maturity and emotional maturity
• frustration with their own differences (e.g., not being able to draw well enough something they imagine or being unable to keep up with older friends on bikes or in sports)

ARE WE GOOD ENOUGH AT IDENTIFYING YOUNG GIFTED CHILDREN TO WARRANT ACTION? ARE THEIR ABILITIES STABLE ENOUGH TO KEEP US FROM BEING SORRY WE DID THAT?

Over the years, at the University of Washington, we have carried out a number of studies with preschoolers and kindergartners who were nominated as advanced by their parents. These studies provide convincing evidence that adults can, indeed, identify children whose development is advanced. We have, for example, found toddlers who were early talkers, preschoolers who were early readers, children in preschool and kindergarten who were precocious mathematicians, and some young children who showed advanced intelligence or skills with puzzles and other activities. All these groups were not only identified accurately by their parents, but also stayed ahead over a period of several years. Indeed, even without intervention they tended to gain ground over time compared with peers in the areas in which they were advanced. And when we provided special experiences, such as math clubs for the math-precocious, they made even more progress.

It’s important to note that in each of our studies, in addition to asking adults to identify the children, we used objective measures of their development. We found in each case that there tended to be pretty close agreement between how far advanced the adults said the children were, and the way they responded to these tests, though there were a few children whose skills were over- or underestimated by their parents. Moreover, there was considerable stability in the measures for the groups over time, though a few children changed one way or the other. We can conclude, then, that when adult observations are combined with objective assessments, we can reliably identify children who clearly are in need of early education that is different from the norm.

We also found, anecdotally, that when parents had deliberately set out to produce a child who was gifted in language or math, those children were different from the others in our research. They might have skills or knowledge but their reasoning was not as advanced as the others who were nominated. One five-year-old had, for example, been taught the 17-times tables but hadn’t a clue about word problems. A toddler whose mother and nanny had deliberately set out to teach him language had a broad vocabulary but not the complexity of expression to match. So much for giftedness being the “fault” of their parents!

WHAT ARE THE RISKS OF DOING TOO LITTLE?

The costs of inaction can be serious. “Letting nature take its course” generally implies placing children in groups primarily by
their calendar ages and letting the brightest ones rise to the top of the class. The hope is that they will set an example for other children by their answers and their work habits and will serve as teachers’ helpers. Letting bright children fend for themselves in this way can lead to negative outcomes that can have long-lasting consequences:

Lost opportunities. Most obviously, critical opportunities for learning are lost, precious time squandered (six hours a day for how many years?) while children spin their wheels waiting for classmates to learn what they themselves already know. During the “B week,” when other children are just beginning to identify words that begin with B, how much is lost for a kindergartner who is reading at the fourth grade level?

Systematic thinking. As we have seen, the period on which we are focusing—ages four-to-seven—is one during which there are typically profound changes not only in what children know, but in the ways they reason. The “four-to-seven shift” involves seeing concepts as logical and related, linking those learned in different contexts and dramatically expanding the ability to grasp systems such as those underlying reading and math. Indeed, “systematic thinking” is the hallmark of the thought processes that permit us to teach academic skills to children, enabling them to make sense of and build on what otherwise are isolated bits of understanding. Since gifted young children master this step at younger ages and more rapidly once they make the transition, their thinking is temporarily on a qualitatively different plane from that of their classmates until, in a few years, the other children make the same transition.

Loss of motivation. Equally potent, gifted children can be profoundly disappointed by their initial school experiences, despairing about the endless years stretching ahead of them with nothing exciting to learn. They develop both negative attitudes toward school and a variety of ways to mitigate school’s impact (morning tummy aches, daydreaming) or to make life more interesting by misbehaving. Bright children deserve a happy and optimistic childhood just as much as all other children do—and this requires that they be accepted and encouraged for who they are—all the sides of them.

Negative emotions. Even the best-hearted children may grow irritable and impatient with the slow pace of things, angry with their classmates for what appears (wrongly) to them to be obstinate behavior that necessitates multiple repetitions of material. Even though they may control these feelings at school, parents and siblings are likely to bear the brunt of pent-up irritability once the restraints of school are over for the day.

Bad habits. And, finally, deeply harmful lessons are being learned by these children who encounter nothing to contradict the notion that the world was so designed that they are supposed to know every answer effortlessly before anyone else and that luckily they have more than their share of being “smart.” They are more likely to feel obliged to perform—to demonstrate and protect their abilities—than to look for opportunities to learn and especially to take chances in situations in which they are not guaranteed that they will be instant experts. They are robbed of the opportunity to develop the inner strength, the true self-confidence, that comes not with doing the easy but mastering the difficult and especially with seeing their initial, imperfect attempts improve with hard work and perseverance. (See Carol Dweck’s recent book, Mindset: The New Psychology of Success reviewed on page 54 of the Fall 2007 Gifted Education Communicator.) These are the young children who greet new acquaintances with, “I’m pretty smart, you know,” or, as one five-year-old told me quite seriously, having seen a Titanic exhibit and having read three or four children’s books on the subject, “I’m one of the leading experts in the world on the Titanic.” How are children to know better if they don’t encounter challenges or other children, their age or older, who think and learn in ways that they do?

WHAT DO WE NEED TO DO?

The initial experiences of infants and very young children are beautifully calibrated to their levels of competence and their readiness to learn. Family members have no trouble engaging young children and leading them gently along by adjusting conversations, games, and the outings they plan. Adults and siblings slip effortlessly into motherese, speaking in sentences just a little longer than the toddler does, emphasizing just the right words, encouraging responses, correcting mistakes, cheering on efforts to master the next steps. It is when children enter group situations—preschools and the early grades of school—that the natural optimal match afforded them within the family breaks down. At this point, children become group members, their individuality submerged, the expectation being that they will conform to age norms. And as early education becomes more and more oriented toward academic teaching, children who already have advanced skills tend to be ignored in favor of those who need more help.
There are a number of ways that parents and teachers of bright young children can avoid this kind of lockstep approach; of course—the secret is in the determination to make it work. Here are some ideas:

- **Informal age groupings** in which children can come and go (e.g., a three-year-old is welcome to join the four-year-olds any time she wants). Children’s programs in parks, libraries, and other public institutions, which are often more flexible about age limits than formal schools, are good possibilities. In them, activities such as crafts, story hours, dance or gymnastics can welcome the younger child who is able to keep up.

- **Multi-age classes** often make it possible for children to do two year’s work in one, or three years’ work in two, smoothly exiting with a group of friends already in place. This solution is effective when bright children are in the lowest grade of a multi-grade classroom, but too often is deadly for them if they need to endure a second or third year in the same classroom unless serious adjustments are made.

- **Self-contained classes of same-age peers** who are similarly accelerated in development. These special programs do require some formal means of selection and often are considered politically incorrect, but provide, simultaneously, a better match of curriculum and of peers, even though the range of abilities in such classrooms is generally still quite broad. (There is abundant research evidence in favor of such groupings.)

- **Early entry to kindergarten or first grade**, based on the child’s readiness rather than the tyranny of the calendar. The rich literature on carefully selected children who enter school early is quite positive, especially for those with mature social skills. (See www.nationdeceived.org.)

- **Grade-skipping**, again based on readiness. For those children whose social maturity, fine motor skills, and ability patterns permit it, simply moving to a classroom in which both curriculum and peers provide a good match is straightforward and happens also to be very inexpensive. This accelerative model also has firm research evidence in its favor.

- **Subject-matter acceleration**: Moving to an older classroom for part of the day, or following a more advanced curriculum in one’s own classroom, can also provide an effective match for children who are not quite up to a grade skip, or whose academic and/or personal-social maturity would make that a questionable choice.

- **Pull-out programs for a few to several hours a week**, assembling children from different classrooms to do more advanced work. This method, while it has its advantages, is difficult to pull off well in part because it is almost impossible to integrate with the rest of the children’s experience. It also tends to identify an “elite” group within each classroom that is not so apparent with other methods. It also is the most expensive option.

- **Flexibility and differentiation within every classroom**—tasks at work centers that vary in skill demands and complexity of concepts; a variety of books and materials, including those from higher grade levels; within-class ability grouping; encouragement of independent work; permitting children to self-select projects of interest and challenge; and, above all, excusing children from lessons they have already mastered. Early childhood teachers also need to keep an open mind about skills a child may be hiding, because even at this age many bright children know they are supposed to behave like everyone else.

- **Cluster grouping**: Placing several identified children in the same classroom rather than “spreading the wealth” across all the classrooms within a grade, so that they can spark one another, work together, claim their share of the teacher’s attention, and escape their isolation at the top of the class.

- **Permitting parents to home school part of the day** in those subjects in which the child is particularly advanced and out of sync with peers.

These methods can exist side-by-side in schools and can provide a rich smorgasbord of options that respond to the individuality of students. Few districts provide them all, however.

**FINALLY, WHAT CAN WE LEARN FROM THESE CHILDREN IF WE PAY ATTENTION?**

Bright children give us a unique window into understanding optimal child development. Here are just two from among all the unasked questions that deserve high priority:

- **Maturity issues**. Are gifted children qualitatively different in their reasoning and learning from non-gifted chronological age peers, or do they only appear to be so because they are simply thinking like their mental age peers? The issue is eminently open to research in the early years, when changes are, as we have seen, so rapid and dramatic.

- **Developmental tasks**. How much—or how little—are early developmental milestones affected by high intelligence? For example, are bright kids faster at acquiring fine and gross motor skills? Do bright infants go through the stranger anxiety phase at an earlier age? Acquire self-help skills earlier? Manage emotional regulation in a more mature way? Understand earlier and more clearly how other people think?

**CONCLUSION**

Early childhood is prime time in every child’s development. All children deserve environments that are tuned to their needs and abilities, that feed their powerful urges to learn and explore, and that afford them the kind of real confidence that comes with mastery of challenges and with the knowledge that they belong to a family and a social group where who they are is just fine. They—and we—will be the losers if we continue to be non-responsive to gifted children. ■

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Rachel Carson once wrote that if she had influence with a good fairy, she would ask that her gift to all children be "a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against the boredom and disenchments of later years" (1998). What brings this "sense of wonder" becomes clear as we follow Carson and her grandson through the Maine woods encountering the splendor of the natural world. There is something profound in this kind of encounter—immediately triggering the child’s awe, curiosity, and intense desire to know. As Carson points out, she never directly taught Roger about the plants and animals they discovered together in their meanderings. He learned the species he found, as well as their habits and ecology, as he poked around and inquired about them.

I mention this anecdote because the arts, with their rich and diverse materials, their potential for exploration, abstract reasoning, and original thinking, provide young gifted students with the same kind of encounter—immediately triggering the child’s awe, curiosity, and intense desire to know. As Carson points out, she never directly taught Roger about the plants and animals they discovered together in their meanderings. He learned the species he found, as well as their habits and ecology, as he poked around and inquired about them.

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The arts play a critical role in children’s cognitive growth, creating the fertile ground from which the seeds of learning grow and flourish over a lifetime. So essential are the arts, in fact, that one notable scholar envisions them as the fourth R in education (Goertz, 2003) and argues that they increase advanced thinking and reasoning.

The artist visualizes and sets goals to find and define the problem, chooses techniques to collect data, and then evaluates and revises the problem solution with imagination in order to create…. The artist, in his or her creative process, requires a higher-order thought process. (p. 460)

Through the realms of feeling, intuiting, experiencing, and imagining—so common in the visual and performing arts—young children can make personal connections with their subjects. Without this source, early education can become a process of disconnection and coercion. A middle school student once described the problem he had when he started attending school.

I kept asking the teacher if I could do certain things and she would say, “Well, you’re just full of ideas!” And I could tell she wasn’t exactly thrilled with me, you know? But I was so bored because we just went from lesson to lesson to lesson and I was like—well—what are we going to do now? At home, we always made stuff. I loved making books by stapling a wad of papers together. One summer I made a botany book. I was four and my Dad showed me how to press flow-
erers and plants and I taped them on each page and I also made, like, these little sketches of the plant parts and then my Mom helped me write about them on each page. Going to school was a let down. There was this one time I remember when we had an art class on the seasons. Kids were drawing leaves and stuff and I wanted to make a book about it, you know, with my drawings and show how the change in daylight affects the trees and why the colors come out like they do, you know, because the chlorophyll is going and all that…. Well, again, she made me feel like that was too much and I was just “full of ideas” and blah blah blah. I felt really sad.

Young gifted children who come from homes that feed their curiosity and creative gifts often have highly developed skills and imaginations. When their parents participate in their activities, which they frequently do, these children can absorb a great deal and become quite apt in discussing their ideas. You will find a young child, for example, who can use his mother’s software for architectural design to show how he would design a space of his own or a child who makes clay models of dinosaurs and describes their physiology in relation to their habitats and way of life. For these young learners, the art of making and doing is learning at its deepest sense and most satisfying.

**ARTS ADDRESS THE STRENGTHS OF LEARNERS**

Creating an arts-oriented learning environment means that, right from the beginning, the strengths of young children will be ushered into the classroom and become the foundation for their development. To some extent, this flies in the face of the mindset still entrenched in our schools where teachers are expected to address perceived deficiencies. A young gifted child may struggle most in this sense because, as with all young learners, his abilities emerge and develop unevenly. Some young gifted children read early; others do not. Some make startling observations well beyond their years while others wander aimlessly around the room looking for something to do. Except in obvious areas such as reading and basic mathematics, highly able young learners can easily be missed. An arts orientation to teaching can help remedy this.

Luis Moll (1992) who conducted groundbreaking research over a decade ago in the poor bilingual communities in Tucson, Arizona coined a term that still applies to all young students and particularly, I believe, to those drawn to the arts: “Funds of Knowledge.” He found that the children in these relatively poor communities possessed considerable knowledge in such subjects as agriculture, economics, science, carpentry, mechanics, mathematics and more. Tapping these “funds” within the children became the foundation for real learning.

In the same way, many young gifted children come to our schools with accumulated experiences in the arts, particularly because art activities use their senses, their hands, their kinetic abilities, and their imaginations. And, as Seeley (1989) points out, these processes enhance cognitive growth, sensitivity, self-expression, and more creative responses to complex problems.

The following areas are particularly worth noting:

- **Sensing and intuiting abilities.** The arts provide ample stimulus for the especially keen and discriminating senses of young gifted children. A child examines paintings on the wall and asks about pointillism, wonders about the V-formation of the Canadian geese flying south, takes time to smell a small violet flower he just spotted near the door, or spends hours fiddling with loose pieces of metal, wire, and other gadgets to create sculptures.

- **Imagination.** The arts demand imagination, the ability to think beyond the box. Young gifted children make easy leaps into the imagination, assuming the identity of other people, animals, even inanimate objects. A child may choreograph dances of the sea, with herself as a wave, act out (or write) stories, rig up an ocean liner in her bedroom with sheets, poles, and cardboard.

- **Patterns, rhythms, shapes.** The visual and performing arts provide new ways to explore shape and pattern, to discover new structures or designs. A child creates an art piece based entirely on the shapes of beaks, claws, and teeth; explores rhythms by tapping out the different patterns in a favorite song; notes the design and rhythm of a choreographed dance; or writes a response to the pattern of color and light in a painting.

- **Self-expression.** The arts affirm the emerging sense of self and encourage young gifted children to discover their own special strengths, styles, and preferences. Young gifted children concern themselves less with the “right way” to do a task. They follow hunches, act on new ideas, delight in the strange and unusual. A child draws a minute and detailed cartoon of a new bug he saw; another does an impersonation of a politician; another makes up stories based on a book of prints belonging to her father.

- **Higher-level thinking.** The arts remove the ceiling on a range of higher level thinking abilities. For a young gifted child, engaging in the arts involves any or all of the following: observation, awareness of relationships, kinetic sensibility, mimicry, linguistic ability, improvisational skill, divergent thinking, problem awareness, problem analysis, synthesis of elements, and imagination.

**GENERAL PRACTICES TO NURTURING CREATIVITY IN YOUNG GIFTED LEARNERS**

I know a first grade teacher who started at a new school in an under-funded district. For him and his students, the arts became a refuge from the drab and barren landscape. Over the summer prior to the new school year, he scavenged around at garage sales and arts events where he amassed a large collection of prints, art materials, nature magazines, videos, and audiotapes as well as a treasure trove of second-hand books from several library sales. The first day of school, a little girl came up and said, “This doesn’t look like school!” and stared at the walls with her mouth open. Colorful prints covered the walls, displaying the artwork of a wide variety of artists from Degas to Kahlo to contemporary photographers and abstract artists. Maps and calendars lay on each child’s desk and bins brimmed over with materials for the projects they would do that year.

The gifted students came alive in his class. In every unit, he drew on some art resource to teach a skill or to stimulate a particular thinking process. Listening to music helped them learn high-
er-level math, theatrical exercises enhanced their writing and storytelling abilities, and constructing sculptures of animals refined their observations about different species and habitats. The high ability learners, of which there were five, found themselves doing quite sophisticated work, as the arts provide the kind of flexibility young children especially need. “I had a girl that year,” the teacher wrote, “who created a story book using a combination of collage and her own writing. I had two boys who made a kind of graffiti-style map of their neighborhood—four times! By the fourth time, with coaching by me and materials I got for them, they had devised their own legend and shared it with the other students. That was a dynamo class because everyone had ideas for how they could improve it and it sort of morphed into this enormous display that other classes came to see.”

CREATING A LEARNING ENVIRONMENT

Creating an environment where this kind of learning can happen clearly requires that teachers model creative freedom and nurture it in their young students. Here are some general practices (Smutny, Walker & Meckstroth, 2007, pp. 40-41) to consider while attempting to instill in young children the openness, flexibility, and inner resiliency that will support their gifts. Originally inspired by E. Paul Torrance’s Why fly? (1995), they provide helpful guidance for teachers who are serious about awakening the creative force in their students:

Preparing the Soil

• Openly share your own creative passions with your students.
• Fill the classroom with art, music, and a rich variety of enticing supplies.
• Design work spaces that beckon the creative muse in your students.
• Applaud originality whenever and wherever expressed.
• Protect students from the saboteurs of criticism, censure, and premature judgment.
• Celebrate risk-taking and bold endeavor.

Planting the Seeds

• Awaken imagination and artistic sensibilities through example and exposure to creative people and their works.
• Create open time for creative exploration.
• Share jewels of wisdom about the creative process.
• Point out the hidden, less traveled paths; warn against set patterns.
• Celebrate the beginning steps of children’s own creative process.

Watering and Feeding

• Design activities that engage the whole child: touching, feeling, imagining, listening, sensing, composing, combining, writing, improvising, constructing, molding, shaping.
• Provide for advanced learning in a variety of fields.
• Assign work that requires creative and imaginative thinking.
• Nurture boldness in vision and endeavor.

Weeding and Growing

• Teach strategies for constructive criticism and evaluation.
• Impart coping skills to deal with peer judgment, crippling perfectionism, and frustration with the creative process.
• Support students’ trust in their own creative power.
• Give them opportunities to correct errors, refine visions, re-write, re-create, improve, and elaborate.
• Find venues for students to show, demonstrate, perform, and exhibit for real audiences in the community.

Applying the Arts to Learning Goals

While the arts are extraordinarily effective in stimulating cognitive growth and higher-level thinking in young gifted children, they need to be used in a targeted and efficient way. Teachers need to carefully consider the aims of their units—the nature and level of the subjects to be taught, the concepts and skills involved, and the processes they entail. Here are some useful questions to consider when preparing to integrate the arts into specific activities:

• What are the students’ learning styles, interests, and special talents?
• What should the children understand as a result of this class or unit?
• What kind of learning experience should they have (inductive thinking, sensing and intuiting, imagining and feeling)?
• Given the above, what kind of activity is required in terms of the level of difficulty, the actual process they engage in, and the materials and sources they use?
• How can the arts support a learning process already in place? For example, would a math problem benefit from a theatrical technique or an exercise in design? Would the children’s understanding of the solar system expand through the creation of a mobile through thoughtful responses to photographs and paintings or through a dramatic re-enactment of a walk on the moon?
• Do the students enjoy moving? Doing things with their hands? Imagining they are someone else? Something else? Somewhere else?
• Which of the arts would best serve the aims and purpose of this specific lesson? What materials?
• In what way would the arts be most effective? As a catalyst in the beginning? As a process throughout the assignment? As a final project?

APPLYING SPECIFIC ARTS TO CURRICULUM SUBJECT MATTER

The accompanying chart shows how specific arts apply to subjects in the curriculum.

A FINAL NOTE

I would like to conclude this article with a quote from a second grade teacher who found herself faced with a seemingly unreachable gifted child:
As long as I teach, I’ll never forget Nadia. She rarely spoke and had few friends. Yet, she showed remarkable writing ability, composing whole paragraphs effortlessly. I shared art prints, recordings of sound effects, music, magazine—anything to feed her imagination. She would politely receive them with a little bow of her head and then went back to her desk, staring at her shoes. When I met the mother who was Russian, I said that her daughter was very bright but that I honestly didn’t know if I was really helping her. The mother suddenly teared up and said, “This year…this year is the first time that Nadia talks, talks, talks, endlessly talks about her stories.” I hardly knew what to say. The mother didn’t speak a lot of English and so I just smiled. Then, she pulled out a large reel of drawings and writings that Nadia had done at home as a result of her work in my class. I was dumbfounded. Dumbfounded and also moved. In halting English, the mother explained that I couldn’t look at it right now because her daughter was still working on it. Before she left that day, she grabbed my hand with both of hers and thanked me. And it just reaffirmed in me a commitment to the creative force—a force that connects someone like Nadia who may feel adrift and lost, back to her own gift, back to her own self.

As Nadia’s story shows, one of the most compelling reasons for the arts is what they can do for a young child’s heart. This is not something we can easily measure or research. Yet the joy and satisfaction on the face of a child who feels released from restrictions, nurtured, and even emboldened to step into the world in a way not possible before is unmistakable. For a gifted child, this freedom and stimulus open the door to extraordinary achievement and to the anticipation of adventures yet to be made.

The Beautiful Dream

I have a dream.
It is a dream of trees that smell like peppermint
and a sky of violet blue,
where the leaves of trees fill up with blueberries
and the walls of houses touch the sky.
I am as light as a fly.
And I fly everywhere...
up, up to the top of a house
or the tallest tree,
or down, down to a pool
as still as a mirror.
I could fly anywhere...
to another land
or up again
into the sunlight of the violet sky.

—Alyssa, second grade

REFERENCES

Joan Franklin Smutny is Director of the Center for Gifted at National-Louis University, Evanston, Illinois. She also directs special summer programs in the Chicago area for thousands of gifted students including disadvantaged, minority, and bilingual children. Editor and author of 13 books, her most recent include Acceleration for Gifted Learners, K-5 and Differentiating for the Young Child.
Inquiry Science For Young Gifted Students
The Pleasure of Finding Things Out

By Fred Estes

Eleonor lies in the grass watching the blue-bellied fence lizard stalk the unwary cricket. Zack and Josie are adding small amounts of various household chemicals to an acid-base indicator and watching carefully for any change of color. Jane and Parker are rolling a ball down a rain gutter that has been propped up on a table with blocks and then measuring the distance that the ball pushes a plastic cube at the end of the gutter. David, Liam, and Isabel are building a dome structure from rolled up tubes of newspaper. These could be typical middle school students engaged in their science labs, but in fact, these are all pre-kindergarten or kindergarten students participating in one of their favorite classes—Science!
Young children are naturally curious and enthusiastically explore their world. They actively observe the world around them, make predictions and test out their ideas dozens, if not hundreds, of times a day to learn how their world works. They use what they learn as the basis of further observations, conjectures, and experiments. In other words, young children use many of the same skills as scientists, engineers, and technologists do, though clearly at a novice level. In fact, the study of experts and how they developed their expertise provides one of the recent breakthroughs in learning theory and practice (Committee on Developments in the Science of Learning, 2000). By examining how experts become experts we can learn important lessons in how to guide the development of all children, and perhaps especially of gifted children, in a rich and complex content area such as science.

How can you teach “real” science in elementary school? What are the elements of a fun and effective science lesson? How do you build coherent science units that develop critical processing skills and develop meaningful content knowledge? My colleague, Lisa Dettloff, and I teach science to young children in a pre-kindergarten to eighth grade school dedicated to serving gifted students, and we have wrestled with these questions over several years. Molly Lusignan, our predecessor, left an amazing 30-year tradition of hands-on science at our school. Building on that foundation, we have created a flexible, inquiry-based science program that runs from PK through fifth grade and dovetails with our middle school science curriculum.

This article presents a flexible design framework for inquiry science units and lessons for young gifted children, along with examples from our classes. Information about where to obtain high quality, readily available science curriculum material is in the reference section. It is easy to adapt published curriculum or create your own lessons using our framework.

But what about regular mainstream classrooms with students at many ability levels? Can one lesson reach students at such different levels? The key is to differentiate instruction with challenging, high-interest content material; inquiry science lends itself well to differentiation. To differentiate science instruction, we vary the starting level, the pacing, and the amount of time needed for instruction or guided experience to learn a particular concept or principle. Every member of your class will benefit from this formula, though what constitutes challenge and interest will vary by individual. Every student will gain by working with material at the right level and by moving toward greater independence in learning in a caring, supportive learning environment.

The expertise studies have shown that highly intelligent people do not really skip steps in learning complex material, but rather they often have prior knowledge in their areas of interest and are able to move more quickly because they “get it” faster (Chi, Glaser, & Farr, 1988). Modularizing instruction, compacting (Reis, Burns, & Renzulli, 1992), independent study projects, and differentiating the focus of a lesson are all tools that allow you to meet a wider range of needs and interests in the same classroom. Used together with appropriate starting placement in the unit, self-pacing and activities of varying difficulty levels are the building blocks of differentiating science instruction. Therefore, differentiated inquiry science benefits all children with gifted children finding that they can move at their natural pace and work at a level they find interesting and challenging.

CREATING A SCIENCE UNIT
Choosing a Focus for Inquiry

The first step in creating a science unit is to choose a focus for the inquiry your students will undertake. In doing this, the two most important considerations are:

• your students and
• your instructional goals

Once you have an established early childhood science program, you will probably create a set of curriculum guidelines with regard to both science content and science process skills. If you have such curriculum guidelines, you then have benchmarks to help you choose what to investigate with your children and to set your instructional goals. If you have no such curriculum guidelines, spend some time perusing the National Science Standards as well as your state’s standards. This will provide enough information about goals, content areas, and key process skills to get started. After much trial and discussion, we have created our own set of flexible and challenging standards based on a number of different sources, including national and state standards which we are continually modifying and updating.

This flexibility allows us to concentrate more on the second major consideration for choosing a focus for our inquiry—and that is our students. Especially at the early childhood level, it is great to let student interest guide your choice of topic whenever possible. For example, in pre-kindergarten (PK) we often begin the year with a walk in the woods near our PK classroom and note what particularly grabs the interest of the children.

This is not as totally open-ended as it seems. For example, in three out of five recent years, the most interesting creature the kids saw on the walk was a banana slug, so we started by studying banana slugs in those three years. This turned out to be a great choice as banana slugs are not only very different from most of the animals the kids are familiar with but also banana slugs play a key role in ecology of the redwood forests of our biome as decomposers. We gathered a lot of interesting materials and ideas for activities about banana slugs in those years.

Another year they became fascinated by some strange looking piles of sticks, so we studied wood rats and their nests. We observed the nests, left out building materials for them, and read books from the library. One of our local universities had an expert in wood rats who graciously visited our class with film clips of her research on wood rat nesting behavior. Whatever topic you choose, serendipity will play an enriching hand in what transpires. In addition to student interest, your assessment of the students should consider:
• their prior knowledge and what content they encountered in previous years
• the class skill profile
• language and cultural factors
• any other individual or group differences that could impact the inquiry.

Our students have always loved our chemistry units, and we love teaching them. They are class favorites year after year. Chemistry has that aura of mystery and magic: powders and potions. Things might explode! Chemistry also provides a great focus for inquiry experiments. Many classic chemistry lessons excite young children and stimulate scientific thinking. For example, making slime is a great, gooey way to start a chemistry unit and a perennial favorite in our classrooms.

**Design and Create Phase:** Once you have selected an inquiry focus based on your students’ interests and needs, as well as on your applicable standards and curriculum, you start to think about designing and creating great lessons for your class. One decision you’ll have to make is whether to use published curriculum or design your own.

The advantage of using the best of the published curricula is that experts have designed them, teachers have field-tested them in many classrooms, and the publishers have revised them. The published curriculum units such as FOSS or STC (see resource section) may have between 10 and 20 lessons around a content theme like organisms or balance and motion, all interconnected and building on each other. Some published curriculum come with kits containing all the materials and well-written teacher’s guides. If you are just starting out and have the funds, one of these published curriculum units can be a great way to launch into doing science with young children.

While the published curriculum can be a great time-saver, be sure you read the whole unit and do all the experiments ahead of time yourself. This is not only so you know what to expect and what might go wrong, but also to give yourself time to learn more about the content. Also, you will probably find that you want to or need to modify some of the lessons. As you use units again, you will find yourself adding in your own personal activities or extensions. This keeps a published unit fresh and makes it more personal for your classes.

In choosing a published unit for your classes, either select a unit that is designed for kids one-to-two years older than your kids or make a conscious effort to gear up the activities and the challenge level for your gifted kids. A disadvantage of a published curriculum is that it may not be what your kids are interested in. For example, suppose your kids are truly taken by the banana slugs and this past summer you bought a great-looking unit on ants. It takes great will power to keep the ant kit on the shelf and create a banana slug unit.

As you become more experienced in teaching inquiry science, however, you will develop an internal template for what are the key objectives for a unit. For example, in a unit on living things, key objectives might focus on food, protection and defense, life cycle, and niche in the ecosystem. At this point, it becomes more fun and relatively easier to develop your own units from ideas you’ve gleaned from the Internet, at science teachers’ or gifted education conferences, from colleagues, or by transforming ideas you’ve seen in published curriculum or something fun that occurs to you just as you’re falling asleep. Following the steps presented here can make this process easier.

**Modularizing:** An intermediate step between a big curriculum kit and totally fabricating your own material are the excellent curriculum guides published by GEMS or TOPS (see resource section) that make use of inexpensive and readily available materials. These guides each have 5-10 lessons about a wide variety of topics. TOPS Learning System guides are organized into small, modular investigations designed for self-paced work, complete with illustrated task cards that give directions and structure for the activities in the investigation. All the children can work at their own pace, allowing gifted kids to move more rapidly through the material as well as spending more in-depth time on high challenge projects, either within the modules of the guide or those you have added.

In addition, you can create multiple pathways through the modules so that not every child must complete each module. For example, more than one module might address a single objective so that you could have one of average difficulty, that fully meets the objective, and another at a more challenging level that goes beyond the minimum requirement. Some children might go directly to the challenge module, some might do the challenge module after the average module, and some might progress to the next objective after completing the average difficulty module. This modularization is one way of helping differentiate the curriculum for gifted students in the regular mainstream classroom.

In addition to moving rapidly through material that is easier for them, it is also important that gifted students have the experience of struggling appropriately with challenging and difficult material. Otherwise, when they first begin to encounter worthy problems, they may wrongly conclude that they are no longer good at science simply because they need to work harder to solve

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**With proper preparation and structure, even young learners are capable of doing amazing work with independent projects in an area of passion.**

—Fred Estes
and Formulas with many classes of young gifted children with great success and trace them all. We have used these lessons, in many variations, and improvised from sources so numerous we can no longer slime science we have borrowed, invented, modified, adapted, examples from a couple of the GEMS chemistry guides, students, as well as compacting and modularizing instruction. practical ways to structure and manage independent studies by that is needed. Renzulli and Reis (2007) demonstrate easy and steps to achieve it, along with the materials required may be all plate allowing the student to specify the final product and the nature, even young learners are capable of doing amazing work showing specified features or developing a detailed plan to pre-exercise and apply different aspects of intelligence (Sternberg & Grigorenko, 2007) such as creativity and practical application. Examples of such projects include building a model of a volcano of the sun. In addition, you can add optional modules that provide more practice and more instructions for students who need it. Also, add in meatiest, more difficult modules, which are also optional, for kids who need more challenge.

Other optional modules might provide important extensions of content that you would have no time to cover with the entire class in a traditional unit on states of matter. Examples might include an extension module on plasma or the major component of the sun. In addition, you can add optional modules that exercise and apply different aspects of intelligence (Sternberg & Grigorenko, 2007) such as creativity and practical application. Examples of such projects include building a model of a volcano showing specified features or developing a detailed plan to prevent injury to villagers living near a volcano that might erupt.

Independent Studies: With proper preparation and structure, even young learners are capable of doing amazing work with independent projects in an area of passion. A simple template allowing the student to specify the final product and the steps to achieve it, along with the materials required may be all that is needed. Renzulli and Reis (2007) demonstrate easy and practical ways to structure and manage independent studies by students, as well as compacting and modularizing instruction.

In sharing curriculum plans with other teachers, we often use examples from a couple of the GEMS chemistry guides, Secret Formulas and Of Cabbages and Chemistry, as well as ideas for slime science we have borrowed, invented, modified, adapted, and improvised from sources so numerous we can no longer trace them all. We have used these lessons, in many variations, with many classes of young gifted children with great success and find that they can be easily adapted to scale the level of challenge.

TEACHING GREAT LESSONS

The lesson design model we use consists of six steps:

• the hook
• the question
• the investigation
• the data analysis
• the conclusion
• more questions

As you can see, our model is similar to other well-known models, such as BCSC’s 5E model (BCSC, 2006), Madeline Hunter’s 7-step format (Wolfe, 1987), and Robert Gagne’s Events of Instruction model (Gagne, 1985). The main difference is that our model is very tactical and lesson-focused. We find using a constructivist model such as we developed is helpful in guiding our delivery. In addition, empirical testing of such models has documented gains in student achievement (Bybee, Taylor, Gardner, Van Scotter, Powell, Westbrook, & Landes, 2006; Hunter, 1991). If we are using a published curriculum, we will loosely follow the steps outlined, being sure to visit the key phases in our model to deepen the lesson.

This model also provides another opportunity to differentiate the same lab for individual students by asking certain students to focus particularly on different parts of the lab. For example, you might ask some students to focus on the data analysis phase, perhaps supplying them with a more advanced analysis technique such as stem-and-leaf data plotting. Other students might be asked to do library research on the history of this experiment, while still others are given a rubric that guides them through a more exacting explanation of their findings. This ability to differentiate focus is another strong feature of inquiry science.

Given ’em the Hook: The first phase, the Hook, draws the students into the inquiry. It can be something engaging, dramatic, and funny such as “Bill Nye the Science Guy” might use to open one of his episodes. It could be something surprising or unexpected as dropping a ball that falls dead on the floor and does not bounce at all. You could roll a ball down an elaborate maze of gutters you’ve set up as a way of riveting their attention. For our slime lesson, we might simply hold up a piece of slime in all its colorful, gooey splendor, saying, “Look at this!” We might also rapidly mix a small sample so they get a quick preview of the process.

In either event, on a cognitive level, you are gaining their attention and focusing it on the study (Gagne, Briggs, & Wager, 1992). Although we all intuitively understand that attention is important to learning, the brain research is demonstrating the critical role of attention in effective learning as content matter competes with dozens of other thoughts and sensory impressions to pass through the narrow channel of working memory find a home in long term memory (Mel Levine, 2003; Gagne, 1985).

Throughout the investigation it will be most helpful to document as much as possible by capturing the questions of the children, their statements of their theories, their interchanges with you and each other, and pictures of them in the thick of their investigation. This primary teaching data will guide you in moving through the investigation and in your teaching and evaluation. This is difficult to do by yourself, so the help of a co-teacher, an aide, or a parent will be invaluable.

The Question Phase: Following the Hook phase that promotes curiosity, you flow into the Question phase. Here you use questions and dialogue to find out what the children already know about this topic and make connections between their prior knowledge and the investigation they are undertaking. Naturally,
you did some of this when you chose among possible investigations. You want something they have some related knowledge to connect with, but not so much that there are few meaningful concepts to discover. If this is the first lesson in a unit, this might be a good place to make lists of “What we think we know about chemistry” and “What we want to learn about chemistry.” These lists can become a roadmap for the following lessons.

A major goal of the Question phase is to raise a Big Question that will serve as a focal point of the investigation. For example, “What might happen if we change the amount of the different ingredients we add to our slime?” Big Questions look beyond the immediate investigation to major principles of science. In this example, students begin to think about the ratio of one ingredient to another which is a fundamental idea in chemistry and led John Dalton to propose the Atomic Theory, one of the biggest ideas in all of science.

Ideally, these opening activities not only direct their attention and make connections, but also help provide a framework for them to organize their new knowledge (Ausubel, Novak, & Hanesian, 1978). This phase provides relevant memory cues that will aid learners in recalling the subject matter. “So chemists can make slime from some pretty familiar materials. Where have you seen slime or slimy things in daily life? What might slime be used for?”

Moving into the Investigation Phase: Once they are engaged and have a focus, it is time to move into the Investigation. It is not necessary that you have made all possible connections or completely assessed their prior learning. We find we move fluidly among the phases of our model, depending on the situation. During the investigation phase, students observe, examine, and discover more about the subject of their investigation. In our chemistry lesson on slime, we give them brief directions and then let them explore the materials. They mix their first batch of slime, color it, and then play with it, stretching it, bouncing it, and perhaps seeing if it will stick to the wall. This is an exciting and energetic phase when the kids confront new phenomena. They want to try out all kinds of ideas and see what makes it work. As a teacher you help them generate new ideas, explore their questions, and investigate possibilities. You help them test out their ideas.

As the more frenetic activity around the investigation burns down to a more even glow, the children develop some intermediate understanding of the material and construct their own theories about what is happening. As you watch and listen to them, think about what aspects of the phenomena you should focus their attention on or what experience would broaden, deepen, or test their understanding. For example, they may believe that adding more and more borax will always make the slime more bouncy. At this point, you guide them into trying variations on a theme. Challenge them to change just one thing and see what happens. In our slime example, does changing the amount of borax make a difference? How about the amount of food coloring? What if you use baking soda instead of washing soda in the slime? Steer them toward making comparisons after changing just one thing. Ask questions about what happened to the slime, how did the slime change, what did it do differently, and how did it look or feel differently.

Let them try it out for themselves and see how this new experience modifies their theories. This is also a time of renewed energy and perhaps some frustration. If the frustration grows to the point where they are in danger of stopping, then provide a helpful hint or a clue, but avoid the temptation to swoop in like Mr. Wizard with the answer. This quashes all further thought on the topic.

Data Analysis: Just the facts, Ma’am: Find ways to meaningfully quantify the differences that the children observe as you move into the Data Analysis phase. How much higher does slime with more borax bounce? Is it heavier? Will it stick to the wall longer? Sometimes coming up with measurements can be a fun challenge. For example, ask the children “What would be a good test of slime stretchiness?” For your older students, watching the TV program Myth Busters shows adults having kid-like fun with science and also demonstrates a creative approach measurement. In one show, for example, the hosts counted the number of ping-pong balls it took to raise a boat sunk in Monterey Bay. Encourage care but avoid being pedantic about accuracy. The main point is for the children to answer their questions and to build the habits and skills of measuring. Comparing the measurements the children make and thinking about what they mean is the heart of the Data Analysis.

Drawing Conclusions and Making Explanations: During the Conclusion phase, the children and you make sense of their investigation by constructing explanations for what they observed and reasoned. Your questions will focus on what they saw and how something happened. Look for general patterns such as “Did adding more and more borax to the slime always make it bounce higher?” “Was slime with more borax more stretchy as well as being more bouncy?” “Did changing the color of the food coloring make any difference in bounciness?” This type of “What” and “How” questions guides their examination and stimulates their observational powers.

Although it will be hard for you to resist asking “why” questions and equally hard for the children to resist making “why” explanations, these are really very difficult questions to answer.
At this point, “why” questions such as “why did adding more borax make the slime bounce higher?” are often counterproductive as young children, even highly gifted young children, cannot be reasonably expected to intuit enough polymer chemistry from these explorations to construct meaningful answers. Base your discussion and questions on the concrete observations the children can make.

In the Conclusion phase, you can also directly introduce some concepts, processes, or skills to help further their understanding. As a general rule, you would not want to supply an answer that the children will readily discover for themselves; this is especially true for gifted children. For example, you could introduce the word “polymer” and tell them that polymer is the name chemists use to describe materials like slime. You could also tell them that polymers are all around us in plastics and that polymers have many important uses such as car parts, food storage, and electronics.

Just how much terminology and causal explanation to do at this phase is an art; be guided more by the interest and enthusiasm of the children, than by the objectives in your lesson plan. It is far better to conclude in the warm glow of a good investigation, knowing there is more to be done, than to absolutely kill a perfectly fun experiment with long, drawn-out explanations. Gifted children have an appetite for knowing why things happen, but you must demonstrate an aptitude for knowing when to stop explaining.

Also, there are always tradeoffs in the time it takes for children to discover an idea and your timetable. Better, however, to err on the side of going deeper into a particular investigation and building the capacity to construct meaning from observations and to revel in what Richard Feynman called “the pleasure of finding things out.”

**More Questions, New Questions, and Reflection:** As you move freely among questioning, investigating, and analyzing, you will come to a point where the inquiry begins to close on itself. Students will not have discovered and explained everything possible in this investigation; they may not even have discovered everything you thought they would. But, like every great party, there is a natural life cycle to an investigation, and to linger on becomes a crashing bore. At this point you want to declare a time for reflection and assessment. This should definitely happen before you and they are so sick of the investigation that you will do anything to move on. Take some time to revisit yet again your “Know” and “Want to Know” charts. Help your students articulate what they have learned and what questions they have answered. What have they discovered? Which questions are still unanswered? What new questions do they have? Was there anything they thought was true but discovered otherwise?

Be especially lavish in your praise if they report that something they thought was true is different from what they thought. Modifying one’s ideas is difficult for anyone, and this is what science is all about. Science is a method for testing the truth of ideas and making modifications to wrong or incomplete theories. Congratulate yourself for creating a learning environment where it is OK to make mistakes and learn from them.

**In Our End is Our Beginning:** This brings us to the end of a cycle of inquiry and also to the beginning of a new cycle. Children always have more questions and the world provides science with a never-ending supply of new puzzles to solve. Young gifted students love studying chemistry, and it provides an exciting gateway into the wonders and fascinating puzzles that are the ken of science. All students learn science more effectively if the unit and the lessons have been developed using instructional design principles such as these. Using easily available resources along with a design model can make teaching science more fun and rewarding for the teacher as well.

We agree with Jennifer Stepanek (1999) of the Northwest Regional Education Laboratory who says that differentiation is “just good teaching.” We also know firsthand, however, that good teaching is very demanding. Our purpose in writing this article is to share our approach so that other teachers can share the fun and excitement of teaching inquiry-based science to young children. Our hope is that this classroom-tested, practical advice makes good teaching a bit easier.

**RESOURCES**

**Full Option Science System (FOSS).** FOSS is a research-based science program for grades K–8, covering a wide range of life, earth, and physical science content areas, developed at the Lawrence Hall of Science at the University of California, Berkeley, with support from the National Science Foundation and published by Delta Education (http://www.delta-education.com/).

**Great Explorations in Math and Science (GEMS).** GEMS
is a line of over 70 stand-alone, supplementary science and math guides. These guides can provide the basis for a whole unit and GEMS offers sequences of life, earth, and physical science by grade level. Developed by the Lawrence Hall of Science (LHS) at the University of California, Berkeley, these guides have been correlated to many state standards and tested for educational effectiveness. GEMS guides are available directly from the LHS (http://www.lawrencehallofscience.org/gems/gems.html) or from a number of science curriculum sources.

**MythBusters.** This Discovery Channel television show subjects urban myths like “a penny dropped from the Empire State Building can kill someone” to rigorous testing. Each week the hosts pick a couple of myths to test, build test gadgets, and perform fascinating tests that often explode, burn, crash, or create a huge mess. This is what kids would do if they had power tools and explosives.


Science and Technology for Children (STC). STC is a complete science program for children in grades K–6. It is the result of a joint effort by the Smithsonian Institution and the National Academics. STC is available from Carolina Biological Supply Company (http://www.carolina.com/carolina_curriculum/stc/index.asp).

**TOPS Learning Systems (TOPS).** TOPS is a line of stand-alone, task-oriented science and math guides that can serve as the basis for a whole unit. Designed by a former Peace Corps volunteer science teacher, these guides use very simple and inexpensive materials for hands-on science lessons allowing many students to work on a variety of activities simultaneously. TOPS Learning Systems is literally a Mom-and-Pop publisher (http://top-science.org/).

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**Common Gifted Education Myths**

**MYTH:**

This child can’t be gifted, he is in special education.

**TRUTH:**

Some gifted students also have learning or other disabilities. These “twice-exceptional” students often go undetected in regular classrooms because their disability and gifts mask each other, making them appear “average.” Other twice-exceptional students are identified as having a learning disability and as a result, are not considered for gifted services. In both cases, it is important to focus on the students’ abilities and allow them to have challenging curricula in addition to receiving help for their learning disability.

Erin sat on the floor of the kindergarten classroom and her long black hair hung in two even braids as she listened intently to her teacher read from the book, Mrs. Wishy Washy, by Joy Cowley. Occasionally, her teacher called on students to fill in a word in the very predictable text.

“In went the cow. Wishy washy, wishy washy. In went the pig. Wishy washy, wishy washy. In went the duck. Wishy washy, wishy washy.”

The hands waving in the air indicated that each child wished to be called on to read aloud the word “cow”, “pig”, or “duck” in the text that matched the picture. Even more fun was to be called upon to sing the words “wishy washy, wishy washy” at the end of each sentence, for every child knew that those words came last. But few hands went up when the teacher presented questions about more challenging text—text that did not correspond as well with the pictures and did not follow a predictable pattern. As the hands went down, the teacher gazed hopefully from child to child. When she realized that no one else could help, she called on Erin to fill in the blanks with words she read easily. It was a pattern that Erin and her teacher had followed often in the first half of the year and one that led her teacher to realize that Erin was a talented reader.
A meeting requested by Erin’s parents prompted her teacher to contact us as we were working in her school on a research project about differentiated reading instruction at the time (Reis, Eckert, Jacobs, Coyne, Richards, Briggs, Schreiber, Gubbins, 2005). Erin’s parents had told her teacher that Erin had begun to complain about not liking school and had felt ill when getting ready for school. This, they felt, was particularly troubling since they believed Erin to be a bright, inquisitive girl. Her teacher knew that Erin was different from the other children in her kindergarten classroom, and she also believed that Erin’s reading talents were just one indicator of her academic precocity. Although her teacher had attempted to differentiate Erin’s curriculum in math and reading from the beginning of the school year, she did not believe her efforts were enough. After conducting a formal reading assessment, however, her teacher found that Erin was reading on a level that would be at least four grades above her current grade. She also admitted that even though she had some experience in differentiating instruction and content, the differences between Erin and her peers, especially in reading, made it difficult to provide sufficient challenge for Erin in the regular kindergarten classroom. This scenario exists in kindergarten and preschool classes across the country as precocious readers face instruction in reading that is well below their challenge level. This article summarizes some research about early, talented readers and suggests strategies that can be used to support and challenge them in school.

WHO ARE YOUNG, TALENTED READERS?

A definition of young, talented readers must be synthesized from what is known about research on three topics: young children, gifted children, and reading. Most research and anecdotal writing on this topic defines gifted readers as those reading about two grade levels above their peers (Catron & Wingenbach, 1986; Reis, Gubbins, Briggs, Schreiber, Richards, Jacobs, et al., 2004). Halsted (1994) believes that talented readers understand language subleties, use language for humor, write words and sentences early, and may produce higher quality creative writing. Additionally, it has been suggested that they automatically integrate prior knowledge and experience into their reading, utilize higher-order thinking skills such as analysis, synthesis, and evaluation, and communicate these ideas (Catron & Wingenbach, 1986). Several researchers indicate that talented readers also have high verbal ability and express themselves well, and early readers are said to use colorful and descriptive phrasing, demonstrate advanced understanding of language, have an expansive vocabulary, perceive relationships between and among characters, and grasp complex ideas (Catron & Wingenbach, 1986; Dooley, 1993; Levande, 1999; Renzulli & Reis, 1989).

What are the differences between talented readers in general and early, above-level precocious readers? Jackson and Roller define precocious readers as those whose progress “through the earliest stages of literacy acquisition is so exceptionally rapid that they merit special attention from researchers and school personnel” (1993, xii). They caution however, that precocity in reading is no guarantee of talent in verbal reasoning and subsequent identification of giftedness. Most recently, Reis and her colleagues (2004) refined a conception of talented readers as those who display enjoyment in the reading process, read early and above level, demonstrate both advanced processing and advanced language skills.

Children categorized as low socioeconomic status enter school with about 6,000 fewer words than peers with middle socioeconomic status (Hart & Risley, 1995), and students who come from language-rich homes are more likely to read early (Morrow, 2005). In a survey by Rogers and Silverman (1998) comparing differences in attitudes between parents of gifted children and non-gifted children, 87% of the parents of gifted children reported that their children had advanced vocabularies compared to 34% of parents of non-gifted children. Likewise, 56% of the gifted children were reported to be able to recognize letters by the age of two, compared to only 33% of the non-gifted children. About 50% of the gifted children were reported as reading easy reading text by the age of four, while only 22% of non-gifted children were doing so. These data confirm that not all gifted children read early, and not all early readers are identified as gifted (Jackson, 1988; Jackson & Roller, 1993; Reis et al., 2004). Jackson summarized this finding by explaining that, “Although precocious reading ability is moderately associated with general intelligence, some highly intelligent children do not read early and some precocious readers are of average or subnormal intelligence” (1988, p. 200).

Although space does not permit a full discussion of the philosophical differences about early readers, several schools of thought surround the process of learning to read. Proponents of the two-stage hierarchical process outlined by Xue and Meisels (2004) believe that students must have the phonics base to “crack the reading code” and must be able to do so before comprehension can occur. The opposing view contends that comprehension can be developed together with decoding and that the development of one enhances the other. Research by Snow, Burns, and Griffin (1998) found that most kindergarteners conclude the year with the ability to read some sight words and that by the conclusion of first grade, they should have a sight word reading vocabulary of 300–500 words. When a kindergartener student like Erin reads at such an advanced level, however, she has transcended the typical benchmarks for that grade level and moved beyond the process of learning to read to the process of reading to learn.

DEVELOPMENTALLY APPROPRIATE PRACTICES FOR YOUNG GIFTED CHILDREN

When teachers consider their students’ abilities, they examine them through the lenses of the grades they teach—lenses tinted by their prior experience and knowledge. What teachers believe and understand about the ability levels of the students and their expectations regarding the curriculum also influences
their perceptions of their students. Both prior training and experience have taught teachers to implement developmentally appropriate content for a given grade level. Many teachers believe that the activities and curriculum that are suitable for students in one grade level will not be suitable for another.

Debate and discussion continues regarding what constitutes “developmentally appropriate practice” for children at both kindergarten and preschool levels. Some teachers and professional educators believe that an academic focus is simply inappropriate for pre-kindergarten programming that should, instead, focus on the social development of young children. The problem with these guidelines is that they usually include recommendations for a particular grade level based on typically developing students, rather than atypical gifted students. Therefore “developmentally appropriate practices” appropriate for most students at a particular grade level are actually inappropriate for gifted students because they do not take into account their advanced intellectual development in a typical area. For example, while it might be appropriate for most kindergartners to learn to form letters by molding clay, such instruction would not advance the literacy skills of a kindergarten student who began the year reading at a second or third grade or even higher level. Developmentally appropriate practice, then, is situational and must be redefined for young, talented readers.

Some instructional techniques typically used to teach older children to read or write may also be useful for early readers (Bodrova, Leong, & Paynter, 1999), but a talented reader’s development may be quite different from his or her chronological peers, and simply using instructional methods from later grades may not be effective, so instead, reading strategies must be differentiated (Reis et al., 2004).

INSTRUCTION FOR THE YOUNG, TALENTED READER

Since the patterns of early readers vary, our experiences in implementing programming options and differentiated reading experiences based on the Schoolwide Enrichment Model in Reading (SEM-R) suggest that differentiation must occur across three components:

- support and challenge
- advanced strategy use
- personalization of interest (Reis & Fogarty, 2006)

Each of these components appears to be essential for the continuing development of young, talented readers, but each must be differentiated to meet the unique patterns of this diverse group.

Support and challenge. The impact of effective literacy teachers on early and struggling readers cannot be underestimated, for appropriate instruction can prevent reading difficulties (Burns, Snow, & Griffin, 1999; Connecticut State Department of Education, 2000; Reis, et al, 2005). Talented readers are also affected by teachers’ ability to teach literacy, to recognize precocity in reading, and to utilize their knowledge of their reading curriculum (Connecticut State Department of Education, 2000), all of which interact with a teacher’s ability to differentiate appropriately. Lamb and Feldhusen (1992) found that only a small number of kindergarten teachers and fewer than half of the first grade teachers surveyed provided alternate activities for students who were already readers during “reading readiness” activities, a finding consistent with other research about differentiation in reading (Archambault, Westberg, Brown, Hallmark, Emmons, & Zhang, 1993; Reis et al., 2004).

Primary grade teachers frequently use small group reading instruction, often creating their own materials rather than using commercially prepared basal readers and worksheets (Juel, Biancarosa, Coker, & Deffes, 2003). Many primary grade teachers use grouping arrangements and materials tailored to individual needs more often than intermediate grades teachers, but little research has been conducted on which instructional strategies can help early, talented readers to make continuous progress in reading.

Support for early, talented readers necessitates the use of alternative learning environments and different reading strategies, but neither of these should occur for all students all of the time. For example, individual work is effective for some early, talented readers but children cannot be expected to work alone all of the time, as the support and challenge of a teacher is necessary to provide adequate levels of challenge. In fact, research about some urban gifted readers in grades three and four found that most had never been challenged in reading and when asked to read even slightly above grade level, these students became frustrated and gave up trying to read appropriately challenging material after only minutes of effort (Reis & Boeve, in press).

Conducting literacy assessments using running records and story retellings has the potential to alert primary grade teachers to reading talents in young children (Bodrova et al., 1999). This is especially important in very young children because they come to kindergarten with vastly different home literacy experiences that affect their reading readiness. Likewise, some precocious young readers may not tell or show their teachers that they are able to read at an advanced level, requiring pri-
mary grades teachers to carefully examine the individual abilities of their children. In Erin’s situation, the reading assessment conducted by her teacher demonstrated that even the differentiated experiences she was providing were not sufficiently challenging for Erin.

What, then, can be done to challenge early readers? A continuum of services, as suggested by Renzulli & Reis (1997), depicted in Figure 1, was implemented for Erin, with differentiated reading strategies and increasing levels of acceleration, in each grouping phase. Two considerations exist when a continuum of services is developed in reading. The first is organizational, relating to where and when students like Erin will be provided with services to meet their advanced reading needs: How and when will precocious readers be grouped together in or across different classes? For example, Erin could have been grouped in an advanced reading instructional group in her kindergarten class, but that would have provided little challenge as she had no academic peers in the class. She also could have been cluster grouped with several like-ability peers from other kindergarten classrooms and assigned to a class with a teacher who had professional development in instructional strategies to support and challenge her in reading (Gentry, 1999). Alternately, if Erin had been attending a larger school, separate classes could have been offered for gifted students who read at advanced levels. In this case, there was not the population of students to support either cluster grouping or self-contained classes for gifted students, and acceleration was the option selected for meeting Erin’s needs.

The second consideration in the development of a continuum of services relates to curriculum and learning opportunities in reading related to decisions about what will be taught and why:

- How much acceleration can and will be made available?
- Will the regular reading curriculum be extended with open-ended, student-selected enrichment, or will it be compacted and replaced with teacher-selected advanced content?
- Will Erin have the opportunity to pursue her personal interests in reading using independent choice?
- Will she be guided to appropriately challenging reading to ensure her continuous progress?

Initially, Erin’s teacher provided in-class differentiation including flexible grouping by ability and introduction to more difficult materials. In this case, Erin’s abilities more closely resembled those of an older student than a kindergartener so the team continued to the next stage in the continuum. In cross-grade grouping situations, children attend class in the area of their strength at another grade level. An exceptionally talented math student might, for instance, attend all classes in her first grade homeroom, but go to third grade for her math class. In this case, Erin’s gifts were in two areas and her strengths in math and reading, accompanied by her advanced social skills, enabled her to be accelerated to first grade. This acceleration was accompanied by differentiation using curriculum compacting (Reis, Burns, & Renzulli, 1993) to eliminate content she already knew, the use of advanced reading strategies (Reis & Fogarty, 2006), and providing advanced content in reading (Reis, et al, 2005).

In cases like Erin’s it is also wise to re-evaluate the placement at the end of the year. Erin’s teachers determined that she should advance to second grade for the following school year, but in rare cases a child might be better accommodated by spending another year in the first grade. A child who has been accelerated will usually perform well in comparison to his or her peers in the new grade level.

Providing adequate challenge for all precocious readers is critical. Lack of challenge can halt the development of early pre-
Precocious readers and cause them to fail to make continuous progress in reading.

**Strategies.** In our review of current research relating to reading strategy use in classrooms for our research on the SEMR, it became clear that agreement exists in current research about the need to integrate reading strategies into reading instruction (Harvey & Goudvis, 2000; Keene & Zimmerman, 1997; Paris, 2004). Reading strategies are used by students to integrate higher-order thinking skills such as questioning, making inferences, making connections, understanding one’s own thinking processes, visualizing, determining importance, and synthesizing in order to make meaning of text.

In our work with teachers we are often asked about the differences between reading skills and reading strategies. Teaching certain reading skills, like word-level decoding, can be a pretty straightforward task for reading teachers because the skills can be taught using rules that can be followed. However, teaching students how to be strategic readers can be much more difficult because the strategies are contextually dependent and lack a distinct pattern for their use. Reading strategies are also more difficult to assess because unlike giving a vocabulary test to measure reading skills, teachers must determine the extent to which students are able to use reading strategies in context. Early readers can be challenged with reading strategy instruction that is appropriately challenging and engages and interests them, as demonstrated in Figure 2.

Helping young, talented readers make appropriate book choices is an important step toward ensuring a continuing desire to read and an appropriate level of challenge. Books for talented, young readers should be selected with appropriateness in mind as well as to introduce these children to advanced content, themes, ideas, and advanced language. Some books we recommend to challenge precocious readers are included in accompanying sidebar.

**CONCLUSION**

Children’s first experiences with reading should be joyful, and they should enjoy and anticipate reading as a happy task for reading teachers because the skills can be taught using rules that can be followed. However, teaching students how to be strategic readers can be much more difficult because the strategies are contextually dependent and lack a distinct pattern for their use. Reading strategies are also more difficult to assess because unlike giving a vocabulary test to measure reading skills, teachers must determine the extent to which students are able to use reading strategies in context. Early readers can be challenged with reading strategy instruction that is appropriately challenging and engages and interests them, as demonstrated in Figure 2.

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**Using Paris’ Strategies to Challenge Young, Talented Readers**

(Adapted from Paris, 2004)

**MAKING CONNECTIONS**

Teachers should ask students to make connections across multiple texts. Doing so adds depth and complexity to the reading experience as the reader compares ways that the texts are alike or ways that the experiences in the text reflect their own experiences. The texts should be on the reading level of the talented reader.

**DETERMINING IMPORTANCE**

Ask talented readers to determine the importance of a setting or a character to the story he or she is reading by asking several ‘What if?’ questions. For example: ‘How would the story be different if this character was not in the story?’ Such questions allow the reader to determine the centrality of the character or the importance of the setting to the overall story plot.

**QUESTIONING**

Students should be encouraged to pay attention to questions that are raised as they read. Especially the case with young readers, it may be hard for them to hold all of their questions in their working memory. These readers should be provided with a set of sticky notes where they can write questions. The notes can be affixed to the page where the question was encountered and removed once the question has been answered.

**VISUALIZING**

Young, talented readers have vivid imaginations. These students can be encouraged to illustrate scenes that they find particularly interesting or even confusing. Doing so often deepens comprehension for these readers.

**MAKING INFERENCES**

Talented readers make inferences easily as they read. It is also important, however, for the students to be cognizant and evaluative of the information that led them to the inference. Therefore, talented readers can be asked to explain or reread the information that provided evidence for the inferences they make.

**SUMMARIZING**

Readers, and in particular young readers, often have trouble with succinct summaries. Teaching them to be economical about the words they choose can help them create stronger summaries with only the most important details included. Instead of asking a talented reader to describe what’s going on in their book, it is helpful to ask them to tell what is going on in 15 words or less. Practicing this way aids them in giving succinct summaries.

**METACOGNITION**

In order to encourage students’ awareness of their reading, teachers can make students more aware of the areas in which they struggle as they read. Young readers should be trained to stop reading when they become confused and do one of two things. The first is to back up to where the story became confusing and reread. If this doesn’t work, the student can write the question on a sticky note and proceed to see if the question is answered later in the text. If all else fails, students should ask for a conference with their teacher.
time that is spent reading books on the lap of a parent or listening to stories in the company of classmates. The more pleasurable these early experiences, the more likely a child will want to read independently and develop the self-regulation necessary to become a lifelong learner (Reis & Fogarty, 2006). Increasing reading interest has been recommended by Burns, Snow, and Griffin (1999) as one of the most effective ways to prevent reading difficulties. Our research has shown that if students do not enjoy reading by the time they are in the intermediate grades, they will not continue to read independently (Reis & Fogarty, 2006). There is a declining trend in U.S. reading scores beginning in fourth grade and continuing through middle school and high school (Elley, 1992), and if we can both challenge and engage precocious readers, we believe we can reverse the trend for this group, and enable them to make continuous progress and enjoy reading.

REFERENCES


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Contexts for Early Childhood Gifted

By Nancy B. Hertzog & Laura Belfchenko

Early childhood gifted education focuses on the learning contexts by which young children develop their interests, dispositions, talents, and skills for life-long learning. Traditionally, young children have been defined as gifted by comparing them to their peers, by identifying advanced academic abilities such as reading or math, or by noticing their virtuoso talents in the arts (e.g., the young pianists, violinists, stage actors). But in today's diverse world where cultures are intertwined, understanding the influences that spawn giftedness and talents in young children begins with examining their early environments.

The Early Childhood Division of the National Association for Gifted Children created a position statement that shares a collection of theoretical best practice research with the intent of bringing forth a representation of early childhood gifted education responsive to the development and needs of young children. The following excerpt from the statement represents the position of its intent and purpose.

Early childhood gifted education focuses on recognizing, developing, and nurturing the strengths and talents of all children ages 3 through 8. Early childhood educators and family members have mutual goals to develop children's capacity and passion for learning to the fullest potential. In addition, research indicates that an interactive and responsive environment in early childhood supports both cognitive and affective growth and establishes a pattern of successful learning that can continue throughout children's lives. (NAGC, 2006)

Young students (ages 3-8) are different from their school-age peers in numerous ways, and these differences provide the rationale for early childhood gifted education to be conceptualized differently from school-aged gifted education. Smutny and von Fremd (2004) said, “As a general rule, the younger the age group, the more dramatic the variations within the group and the more likely the differences in tests or in the performance of any task reflect differences in developmental level” (p. xii). One of the reasons for this strong variance in the early years is related to the background knowledge that young students bring to their early learning experiences. According to Zimiles, “Teachers of young children need to continually reassess their assumptions regarding the general availability of background knowledge that serves as an explanatory context for their statements. Background knowledge remains one of the hidden determinants of academic achievement” (1991, p. 34).

The impact that early learning environments have upon young children is the key factor in recognizing the importance of defining early childhood gifted education with a focus on the learning contexts that develop potential. The studies that refer to giftedness in the early years are generally defining giftedness by a high score on a standardized measure of intelligence. The notion that standardized assessments should be used to identify or sort children in early childhood defies what has been determined best practice for early childhood education. The position statement of the National Association for the Education of Young Children (NAEYC) specifies: “Ethical principles guide assessment practices. Ethical principles underlie all assessment practices. Young children are not denied opportunities or services, and decisions are not made about children on the basis of a single assessment” (2003, p. 10).

Using a domain-specific framework for giftedness, rather than a general framework (high IQ) serves the parents, teachers, and children better in early childhood classrooms than identifying a child as gifted and expecting teachers to prescribe curriculum for the “gifted” child. If the child is a particularly talented reader, then the direction to challenge the child in that area becomes clearer. If the child is an exceptional artist, teachers can provide different opportunities for artistic talent to develop. Because children are so young, their environment should provide multiple types of opportunities for their potential to be tapped. Olszewski-Kubilius and Limburg-Weber (2003) summarized the research in early talent development and noted, “Parents and teachers who notice above-average interest and ability in their children should remain alert to the possibility that predicting the direction a child's talent will take as he or she matures is a tricky proposition” (p. 7). Early childhood education should provide a variety of types of experiences so that children's strengths and talents can emerge.

Child Development and the Critical Role of the Home Environment

The creation of rich and engaging learning environments in schools, homes, and communities during early childhood can enhance educational opportunities for learners and help put children on the path to academic achievement. Early childhood educators and family members play powerful and critical roles in
Early literacy development is a community of practice (Wenger, 1999) where literacy and language learning are more broadly seen as a set of social practices stimulated in and out of a classroom setting. Literacy from this perspective implies capable participation in a given social context where learning takes place. This can be through student curiosity in sciences, social settings, self, community, and global awareness. Demonstrations of literacy and advanced thinking acquisition by young apprentices (Rogoff, 1990) emphasize the importance of stimulating children's cognitive growth. Literacy development should not be looked at merely as a simple cognitive skill to be learned but instead as a complex interactive and interpretative process in which development is determined by the social and cultural context (Wink & Putney 2002). Advanced learning and literacy development do not occur at a zone of actual level of development; but rather, it occurs in the zone of proximal development. This is defined by Vygotsky, as “the distance between the actual developmental level as determined by individual problem-solving and the level of potential development determined through problem-solving under adult guidance or in collaboration with more capable peers” (1978, p.86). With this as a foundation, reading with self-regulation can be considered to be “the child’s capacity to plan, guide, and monitor his or her behavior from within and flexibly according to changing circumstances” (Diaz et al. 1990, p.130). It is a self-extending system “to cross-check one source of cues with another, self-correct when meaning...
does not make sense, and solve new works by flexible and varied means,”(Clay 1991). This often places the early childhood reader in an asynchronous proximity to his or her age and grade peers.

In order to promote higher-level literacy development in young children, practitioners should:

- Carefully observe young children in their process of learning.
- Design instructional interactions and materials that involve children in using their personal knowledge as a foundation for constructing new learning.
- Monitor children’s progress in the new situation and be prepared to make spontaneous adjustments in their levels of support to ensure that children continue to learn and reach challenging levels of potential with varied materials.
- Use observations of children’s learning to evaluate and plan new instructional interactions and materials that validate old knowledge and active new learning (Dorn French & Jones, 1998, p.2).

Young children with external performance levels that extend beyond these definitions are those children whose metacognitive processes allow them to go beyond their age peers. They do this with emotional intensity, share their comprehension of written language, and understand the task of learning to read and reading to learn while using their unique processing abilities.

**Issues in Early Childhood Gifted Education**

Issues that present themselves in early childhood education relate to the difficulty of providing both an intellectually stimulating and yet developmentally appropriate curriculum. The four-year old who reads at the fourth grade level is not necessarily developmentally ready (emotionally) to read fourth grade literature.
• Should young children be identified as gifted early and placed in separate programs?
• Should they jump grade levels to be with their “academic equivalent peers?”
• Should they participate in the paper and pencil activities (abstract) that are more common with upper elementary students?

The responses to these questions demonstrate the ways early childhood gifted education may differ from school-age gifted education.

What are Researched Best Practices in Early Childhood Gifted Education?

The National Association for the Education of Young Children developed the following evidenced-best practices which can also be found on the website of the National Association for Gifted Children:

1. Environments that are least restrictive
2. Services that are family-centered
3. Service delivery that is collaborative
4. Practices that are both empirical and value-driven
5. Practices that are both developmental and individually appropriate


ENVIRONMENTS

Katz summarizes the research of others as follows: “A rich body of research on curriculum approaches designed for cooperative learning (Katz & Chard, 2000) provides compelling evidence that long-term academic and dispositional outcomes are achieved when children are taught in groups that are mixed in ability, age, ethnic, and socioeconomic background and that are oriented toward cooperative goals (see also Katz, Evangelou, & Hartman, 1990) (Katz & Chard, 2000 p. 53). Educators must create contexts for students to engage in interactions with other children to develop their social competencies.

Services That Are Family-Centered And Collaborative

The importance of families in the education of young children cannot be underestimated. Smutny and von Fremnd stated, “Parents are often the most realistic predictors of their children's abilities and needs, especially from birth to age 8” (2004, p. 35). Parents are the first teachers, and families play critical roles in supporting development of potential (Olszewski-Kubilius & Limburg-Weber, 2003). Therefore, it is essential that teachers, families, and community agencies (e.g., day care, early intervention services, health care providers) work together to best meet the needs of young children. Parents have legal rights to have their preschool children screened for early intervention services by personnel in their public school district. Often, it is a doctor who detects a disability or health problem that may or may not affect the cognitive functioning of the child but would impact services provided for that child. Teachers of young children must be sensitive to the role that family values play in understanding the contexts in which their students live. Independence and autonomy, while highly valued in American young children, may not be stressed in homes where families come from other cultures. Parents from different cultures are learning about American schools and teachers are learning from them. Helping children be successful in preschool and primary learning environments means working and communicating with parents in two-way dialogues.

Practices That Are Both Empirical And Value-Driven

Today the importance of “good starts” to a child’s education is acknowledged, and there is great attention given to curriculum for young children. Curricular models in early childhood education are varied. How should young children best be challenged? Head Start Programs have a mandated curriculum. Most states have Early Learning Standards, but thousands of young children are in home day care centers where there is no control over what caregivers do to nurture the potential of young children. The temptation is for teachers to follow curriculum mandates with little regard for input from the children. However, a body of longitudinal evidence describes the long-term effects of some specific curricular models or approaches—with benefits identified for curricula that emphasize child initiation (Schweinhart & Weikart 1997; Marcon 1999, 2002). Much of the research supports the inclusion of inquiry-based activities for young children with opportunities for them to pursue topics of interest to them (Katz & Chard, 2000). This type of approach serves children who have wide differences in abilities because they can engage in project investigations relative to their own interests and at their individual readiness levels. When defining appropriate curriculum for young children, Bredekamp and Rosegrant (1995), stated:

Because children bring meaning to learning experiences based on their past experiences and individual development, different children acquire different learnings from the same experience. As a result, curriculum for young children should not be based on a rigid scope and sequence but should help children connect new learning to what they already know and are able to do. (p. 20)

Katz refers to the “optimal level of informality” when describing the balance between an informal context for learning in “which children can reveal their understandings,” (Katz & Chard, 2000, p. 49) but not so informal that it leads to chaos and not so formal that teachers do not take into consideration the understandings of children to make their instructional decisions.

Practices That Are Both Developmental And Individually Appropriate

One of the key requirements of curriculum for young children is that it be both developmentally and individually appropriate. Bredekamp and Rosegrant (1995) articulate this principle:

Curriculum content reflects and is generated by the needs and interests of individual children within the group. Curriculum
incorporates a wide variety of learning experiences, materials, equipment, and instructional strategies to accommodate a broad range of children’s individual differences in prior experience, maturation rates, styles of learning, needs, and interests. (p. 20)

“When teachers engage in individualized teaching, they are expressing and modeling a respect for diversity. Conversely, when children learn about the range of variations that surround them, it is easier for them to find their niche and become attuned to their own distinctiveness” (Zimiles, 1991, p. 38). Teaching young children respect, tolerance, and acceptance of diversity involves giving students opportunities to take different perspectives, to negotiate arguments, and to develop empathy for others. A sense of belonging (being included) and community are essential elements of the early childhood environment that builds self-competence and teaches them core values of respect, tolerance, and kindness.

CONCLUSION

Early childhood gifted education is the core body of knowledge that focuses on the factors that nurture and develop giftedness and talent potential. Although the literature still dwells on the definition of young gifted children as those with high IQ scores, evidence-based practice provides alternative foci and perspectives for developing and nurturing giftedness. Evidenced-based practice supports a broadened conception of giftedness, a focus on challenging, yet informal curriculum, and an emphasis on the teacher building an inclusive, tolerant early learning environment that provides opportunities for hands-on exploration of materials and interactions among teachers, families, and students.

REFERENCES


Nancy Hertzog, Ph.D., is Associate Professor, Department of Special Education at the University of Illinois at Urbana-Champaign; she is a past chair of the Early Childhood Division of the National Association for Gifted Children.

Laura Belshechenco is Assistant Superintendent of Curriculum and Instruction for the Wauconda Community Unit School District #118, in Illinois. She is the current chair of the Early Childhood Division of the National Association for Gifted Children. She was named the 2005-2006 NAGC Administrator of the Year.
Gifted students are specialists in imponderables. Simple questions can be very hard to answer, but that only encourages the asking; nothing doesn’t stop them. Let us, therefore, tackle the idea of zero.

Beginning with an awareness of zero, students will try to picture the concept and then employ these pictures to differentiate among its vital uses. An historical number line will locate this solid development in mathematics across time. The lesson concludes by calculating with and writing about the infamous zero. Elements of the exploration will intrigue gifted early learners, and much of it will challenge the upper grades.

**VISUALIZING NOTHING**

The counting numbers are a useful part of civilization; from the number of sheep in a corral to the trillions in the national debt, the number of things has always mattered. Especially if it is none.

When a young child is starting to count, ask what comes before “one.” When the answer is “nothing,” talk about the idea of zero. When asked about zero, a new kindergartner replied, “It means nothing. But, if you put it with 2, it means something.” What would that something be? Just what kind of a number is zero?

These questions initiate thinking about zero and its close relative, nothing. The following activity and its extension make this awareness concrete in very young learners and then will be employed to identify the usages of zero—as a whole number and a metaphor. The creative guessing game can also be applied at higher levels of sophistication for older students.

**Activity:**

What would a picture of zero—or nothing—look like? Hold up a blank paper and ask what it could be a picture of. Bring up the old jokes about a polar bear in a snowstorm (zero degrees?), or a cow eating grass where all the grass has been eaten and the cow didn’t stay around (zero population?). Talk about possible drawings—an empty plate or a glass, a person with his mouth closed or just sitting in a chair (zero miles per hour?), a scoreboard before the game has started or showing the result of a shutout, a countdown for a rocket (liftoff, no zero), or 10 tally marks or both hands with the fingers spread apart (the zero placeholder in 10). Allow a short interval to create illustrations, and be sure to keep the ideas secret until it is time to guess.
Now, ask the young people to let the group respond to the drawings; record all the variations for each representation. Did anyone guess the intent of the illustrator?

Extend this activity by using the group’s responses for differentiating among counting numbers:

- no zero
- whole numbers—which start with zero
- and metaphors for “nothing.”

Consider why the counting numbers are also called the natural numbers; when learning to count in a foreign language, for instance, the word for zero is not a natural inclusion.

Discuss why a point for zero is necessary in a number line or on a ruler to make it “whole.” Older students could think about the reason the 2000s are called the twenty-first century.

Talk about how a picture can represent nothing happening. When is nothing a wise response?

Make these distinctions clear with the group by placing the initial examples into the classifications listed in the table below.

With the group, decide how each of their various responses to the illustrations could be similarly categorized.

### PUTTING NOTHING IN ITS PLACE

When did the concept of zero come about? History differs as to the origin, and not too surprisingly, many civilizations claim its initial use. J. J. O’Connor and E.F. Robertson have written an informative article entitled “A History of Zero” (posted online at [www.groups.dcs.stand.ac.uk/~history/Indexes/Indians.html](http://www.groups.dcs.stand.ac.uk/~history/Indexes/Indians.html)). “If someone had come up with the concept of zero which everyone then saw as a brilliant innovation to enter mathematics from that time on, the question would have a satisfactory answer even if we did not know which genius invented it.” For older students, this would be a good article to make available.

**Activity:**

It always helps to visualize relationships over time and hook them to points of reference familiar to the student. Using a timeline to show the development of zero will necessitate placing events within a time period rather than a specific date. Although zero is a natural part of today’s worldwide culture, its beginnings are difficult to trace and authenticate. To place it in a familiar landscape, students could anchor the timeline to specific people, discoveries, and events during those periods. Within these focused periods of time the students can subjectively overlay the slippery biography of zero or create group poster reports for the relevant periods in zero’s history. An interesting style of timeline can be found at: [faculty.oxy.edu/jquinn/home/Math490/timeline-html](http://faculty.oxy.edu/jquinn/home/Math490/timeline-html). Another example of a high school math timeline with links to other sources is: [lahabra.seniorhigh.net/pages/teachers/pages/math/timeline/MpreAndAncient.html](http://lahabra.seniorhigh.net/pages/teachers/pages/math/timeline/MpreAndAncient.html).

Some of the developments to note relating to zero or place value—as it is more often referred to—are listed here:

- About 3000 BC Babylonians begin using a place-value system without a zero place value.
- About 1400 BC China starts to use a decimal number system with no zero.
- About 628 AD Brahmagupta uses zero and negative numbers.
- About 650 AD India’s mathematics used a place value system that employed zero.
- About 700 AD Mayan mathematicians use a symbol for zero in their number system.
- About 876 AD India’s first recorded use of zero
- About 950 AD Abacus reintroduced to Europe using Indian/Arabic numerals without having a zero

<table>
<thead>
<tr>
<th>Counting</th>
<th>Place Value</th>
<th>Metaphor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents of glass as in amount or volume</td>
<td>Empty plate as in nothing left</td>
<td>Empty plate as in wanting more</td>
</tr>
<tr>
<td>Counting by fives</td>
<td>Miles per hour</td>
<td>No activity; nothing accomplished</td>
</tr>
<tr>
<td>Use of tally marks</td>
<td>Use of 0 on scoreboard as place holder</td>
<td>Lack of expressed ideas</td>
</tr>
<tr>
<td>Count down when a rocket is launched</td>
<td>0 degrees</td>
<td>Mouth closed—silence</td>
</tr>
</tbody>
</table>
• About 1149 AD Al-Samawal develops algebra; uses negative numbers and zero
• About 1200 AD Chinese start to use a symbol for zero
• About 1600 AD Use of zero becomes widespread

Source: www.history.mcs.standrews.ac.uk/Indexes/HistoryTopics.html, sponsored by the School of Mathematics and Statistics, University of St. Andrews, Scotland.

CALCULATING WITH ZERO

Using calculators, the students should try dividing any number by zero. After this has been tried, ask why they get an error message. Encourage the testing of other operations involving zero: adding, subtracting, and multiplying with zero present no problem; even dividing zero by another number is legal. What is going on?

Activity:
Challenge the students to work out why division by zero is not easily answered. Assist those in need of a hint by establishing that division can be thought of as repeated subtraction. Start the thinking by showing that multiplication is repeated addition. Ask what is a quick way of solving $6 + 6 + 6 + 6 + 6 + 6$? The quick way, of course, is to multiply the number you want to add—in this case, six—by the number of times you want to add it—in this case, seven. This is where the multiplication table comes in handy if you don’t have a calculator nearby. Give the students some time to consider how this perspective of a repeated operation could be applied to division.

To help the thinking, use a concrete example to frame the process: if you wanted to share 42 pieces of candy in bags of six, how many bags of six could be made from your collection of sweets? This could be solved by first taking away a bag of six candies from your supply of 42, leaving 36; then, by taking away another bag of six, leaving 30, and so on, until you completed as many bags as possible—the number of lucky friends solved by repeated subtraction. Ask the students to reason how division would be a quicker way to bag this answer.

So, returning to the big question, how many times could you take away bags with nothing in them? Don’t worry, the calculator doesn’t know, either. Packing up empty bags isn’t allowed. Have the class devise a better response than “error” when 42 divided by zero is tried. Should the calculator have a readout of “infinity”? Does anyone have that many friends?

A highly gifted young mathematician might still ask why you can take away zero using subtraction but not be able to do it a multiple number of times using division. Encourage this thinking by asking how the answers for subtraction and division are different.

With subtraction, you take away zero, and the result is easy to report—as well as the outside-the-box-question of how many times you did it: once. With division, you are asking how many times you can do it. The useful but simple-minded world of arithmetic is not set up to answer that regarding zero. “Unlimited” is not a part of the arithmetic vocabulary. The pass-the-buck answer is that division by zero is undefined.

SPEAKING OF NOTHING

Thinking beyond the calculator, upper grade and older students will find a useful source of inspiration in the literary representations centered on zero or nothing.

Activity:
Use the following topics for class discussion or short essays.

• Compare the entrepreneurial advice “nothing ventured, nothing gained” with “better safe than sorry.”
• Regarding a body of knowledge, which is the surer path to wisdom: the cautioning of Josh Billings, “It is better to know nothing than to know what ain’t so” or the you’ve-got-to-start-somewhere push by Lucretius, “Nothing can be created from nothing”?
• In science, the state of nothingness is progressively filling with ever-smaller somethings and larger entities such as more distant galaxies and space-filling dark matter. Given Spinoza’s proposition that “Nature abhors a vacuum,” students might contemplate whether “something is more stable than nothing.”
• Contrast the value of an historical perspective as represented in the be-gentle advice, “Cynicism is the practice of reducing every hero to zero” with the bleakness of Shelley’s ominous verse Ozymandias:
  “My name is Ozymandias, king of kings:
  Look on my works, ye Mighty, and despair!”
Nothing beside remains. Round the decay
Of that colossal wreck, boundless and bare,
The lone and level sands stretch far away.
• Present arguments on the connotations—positive, neutral, negative—of these terms: ground zero, zero tolerance, zeroing in, zero hour.
• Interpret this enigmatic dialogue between a parent and child:
  “Where did you go?”
  “Out.”
  “What did you do?”
  “Nothing.”

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Character Really Does Count

There was a synchronicity about it all. My car stopped for the red light near the end of the ramp. I drove off with tears in my eyes, not just for his situation, but for his awareness that it was his own fault.

His face was such a nice face…though terribly tired looking. I rolled down the window and didn’t think about how foolish that could have been. I handed him a five-dollar bill and said, “I am so sorry that you have to be here.”

He said in a sad voice, “That’s OK sweetheart; it’s my own fault. Thank you so much.”

 Nevertheless, regardless of the quality of guidance or the lack of the genes, how a child deals with responsibility is going to determine the patterns in his life—in his future. His whole character is going to be formed by these early inputs.

Michael Josephson, founder and president of the Josephson Institute, serves without salary for that Institute. He believes that Character Counts, but he is unique in that he doesn’t just speak about character. His program can be applied school wide in any school. With all classes participating, the language and the activities are consistent. He believes that character can be developed, regardless of ego strength and regardless of ability. The genius of his program is in the finite details that show children exactly how to develop their character.

The foundation for his program is based upon his Six Pillars of Character: Trustworthiness, Respect, Responsibility, Fairness, Caring, and Citizenship.

These are the pillars, but how this is all implemented is manifested in a most effective program.

And best of all, Character Counts lends itself to gifted characteristics. The Internet is filled with gifted programs that integrate these Six Pillars into their curriculum. How gifted children apply these Six Pillars is directly related to the very characteristics of the gifted that have been part of our gifted programs all over the country.

Some of the vocabulary from the program (www.charactercounts.org/def-six.htm) is listed here. The full program is impressive; this is just a flavor.

Trustworthiness: Be honest
• Don’t deceive, cheat or steal
• Be reliable—do what you say you’ll do
• Have the courage to do the right thing

Respect: Treat others with respect; follow the Golden Rule
• Be tolerant of differences
• Deal peacefully with anger, insults and disagreements

Responsibility: Persevere; keep on trying!
• Always do your best
• Use self-control
• Think before you act—consider the consequences

Fairness: Play by the rules
• Be open-minded; listen to others
• Don’t take advantage of others

Caring: Be kind
• Be compassionate and show you care
• Express gratitude
• Forgive others

Citizenship: Do your share to make your school and community better
• Cooperate
• Be a good neighbor
• Obey laws and rules
• Respect authority

The distance between my not-so-young man who faced the truth and our children who haven’t the foundation yet to understand such truths is great. And we who are going to fill in the gap between those worlds have the responsibility to contribute to early habits. We don’t want our Pre-K babes to end up like my not-so-young man… with sad eyes… on a freeway ramp.

CALIFORNIA ASSOCIATION FOR THE GIFTED
I believe that the motion picture is destined to revolutionize our educational system and that in a few years it will supplant largely, if not entirely, the use of textbooks.

—Thomas Edison, 1922

That was perhaps an extreme vision of the possible use of motion pictures in the classroom but now in 2007, we have not even come close to his vision. There were and are many roadblocks to the integration of video and visual media into the curriculum. One major one is (or was) the lack of availability of resources practical for a teacher to use.

Veteran teachers will remember the 16mm movies that were shown in classrooms throughout the country. Teachers would order a title and receive the movie in a round tin. The projector was cumbersome to "thread," and many teachers did not use films for that reason. Others taught one or two students how to do it, and turned the task over to them. It was impossible to stop the movie or select clips to focus on a concept; in fact, if it was stopped for any length of time, the heat from the bulb would burn a hole in the film. Most teachers ran it from start to finish. At best, this was an adequate way to bring movies into the classroom.

Flash forward in time and we find most classrooms using VCRs. Teachers could now show taped films on a television set. The content was still linear, but with the rewind tool, it was easier to find and review important concepts in the video. This was much easier than 16mm films but still not ideal.

Move to the present and the above problems are eliminated by using an online digital media library called united streaming from Discovery Education. With this resource, educators have access to 5000 standards-based educational videos. In addition, the videos are divided into segments that can be accessed independently; there are 50,000 content-specific segments. The collection includes material from producers such as Discovery School, BBC, United Learning, Scholastic, Standards Deviants, and Weston Woods.

New teachers in classrooms with resources available from United Streaming cannot imagine the past difficulties of providing appropriate, timely visual media for students. Now information is available with a quick search—and at the click of a button—whole videos, parts of videos, and lesson plans that accompany videos become available. For example: A discussion of Pearl Harbor is taking place in a history classroom. A student notes the comparison between Pearl Harbor and 9/11. The teacher can, within a minute or two, pull up information on both topics with clips to show the students. Clips of President Bush’s response to 9/11 can be compared with FDR’s response to Pearl Harbor.

Or perhaps students are studying biomes. They can select clips of biomes and easily find differences and patterns of similarities with these subject-specific clips. Students can be given the opportunity to make connections, see relationships, discover patterns, trends, and change over time. These challenges may be appropriate for all students, but they are essential for gifted students.

The content is correlated to state standards and can be searched by state. Additional search options include keyword, subject area, and/or grade level.

The site also features teacher tools—Assignment Builder and Quiz Builder and a Writing Prompt Generator—that will work with united streaming images. These templates, lesson plans, and
assignments can be created and provided online to students. In addition, there are also lesson plans and assignments that can be downloaded to use. Many of these provide excellent outlines of lessons and links to resources. Most will need to be modified to ensure that they include higher-level, in-depth activities that will challenge gifted learners. Teachers can choose to receive an e-mail when a student finishes an assignment. A home page for each teacher is available so they can store the material they create. There is also access to professional development resources that include a video library of best practices, live web seminars, technology demonstrations, and tips on using educational software.

In addition to the video material and the teacher resources, united streaming now also includes a library of over 20,000 images and an audio library of sound effects and songs; animated textbook diagrams; a library of primary images; and images of historical events and cultural figures.

This resource is not just for teachers. It has great value as a student resource tool. Students learn research skills as they access visual content. The material can be viewed or saved to use in multimedia presentations. Students’ on-line activities as well as their work can be saved and tracked by their teacher.

This subscription-based resource is available through Discover Education. They offer three options for school districts as well as a home school option.

**Internet Subscription:** The Internet subscription lets schools stream and download unitedstreaming video content directly from the Internet without the addition of a server, additional software, or changes to infrastructure. Subscribers have access to administrative tools for local control and have the ability to restrict streaming and downloading during peak Internet usage hours.

**Annual Site License:**
- $1,995 per High School Building
- $1,495 per K-8 Building

They also offer two local host options whereby schools may download content and store it on their own server. This eliminates dependency on the Internet.

More information can be obtained from the website at: streaming.discoveryeducation.com/, then click Product Information.

The phone number for K-12 districts is 1-800-323-9084. The phone number for homeschool information is 1-800-627-9418.

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gifted children start out life in wonder. It's our job, as parents and educators, to nurture their curiosity, and feed their mind, body and spirit. But what's the “right” way to do this? How do we find the balance between opening the world of wonder to the bright child, and pushing the child too hard, too far, and too fast? What is the difference between “letting the child be a child” and holding her back? And where can we find the answers?

The Internet offers many answers, and even more questions. There is no “perfect” formula for raising a gifted child, but with our youngest learners, there's one easy answer: Follow their lead. Don’t push a 3- or 4-year-old to read if they're not interested, but do not deny them if they're asking. Don’t force a small child to study flashcards, but if they love flashcards (yes, I raised one of these!) and want to work on the math cards, or the word cards, or the shape cards... by all means, work with them. And never say, “Just wait; you’ll learn how to do that in first grade.” Gifted kids tend to take such comments seriously, and later refuse to read because “I'm not in first grade yet!”

Ann and Elizabeth Lupkowski offer a great survey of the characteristics and needs of gifted preschoolers in: Meeting the needs of gifted preschoolers, findarticles.com/p/articles/mi_m1053/is_v14/ai_3658754/. IQ tests aren't designed to identify these youngsters, but through parent and teacher observation they are easy to spot. And those same observations give us the cues we need to meet the needs of these unusual young children, and the characteristics we should look for in a teacher for young gifted children.

What are the characteristics of extremely gifted young children? Kathi Kearney answers this in: Frequently asked questions about extreme intelligence in very young children www.gt-cybersource.org/Record.aspx?NavID=2_0&rid=11375. Kearney answers
many questions, including: Do profoundly gifted young children have specific developmental needs? And What are some of the challenges in meeting a profoundly gifted young child’s educational needs? She dispels many of the myths surrounding these wonderful young children. Don’t miss this article!

And what happens once the young gifted learner enters school? Joan Franklin Smutny offers great information on Teaching Young Gifted Children in the Regular Classroom, haoigesgifted.org/eric/e595.html. Smutny offers insight on identification of the young gifted child—it’s not just all about the high-stakes test. Portfolios and parent consultation are important factors in early identification. Next, she describes the ideal classroom for the young gifted child, including flexible grouping of students for learning activities, and allowing gifted students to choose activities that interest them. Smutny offers good advice for every classroom teacher. And for even more information, read Smutny, Walker and Meckstroth’s book Teaching Young Gifted Children in the Regular Classroom: Identifying, Nurturing, and Challenging Ages 4-9 (for teachers) or Smutny, Veekner and Veekner’s book Your Gifted Child: How to Recognize and Develop the Special Talents in Your Child from Birth to Age Seven (for parents).

If you’ve got a math-gifted young child, be sure to read Ann Lupkowski-Shoplik’s article Developing Mathe-matical Talent: Advice to Parents, www.dukegiftedletter.com/articles/vol6no1_talent2.html. Shoplik starts with a list of possible options, then moves to Stanley’s model of Diagnostic Testing —> Prescriptive Instruction. Research shows that DT—>PI is an excellent educational plan for gifted math instruction.

Arthur Costa describes his “Habits of Mind” in Developing Your Child’s Habits of Success in School, Life and Work, habits-of-mind.net/pdf/Habits_of_Success_Parents.pdf. These six simple habits can change a life. And teaching these habits to our children will prepare them for a happy, successful future.

Arlene DeVries offers both parents and teachers wisdom in Appropriate Expectations For The Gifted Child, sen-gifted.org/articles_social/DeVries_AppropriateExpectationsForTheGiftedChild.shtml. The social and emotional health of gifted children depends on many factors, and it’s up to us as parents and teachers to support them throughout their development. What can we do to support and nurture our gifted children, and why are these things necessary?

Here’s some food for thought: A new study shows that most kids are not getting as much sleep as they need. And this lack of sleep can affect their cognitive abilities, and their emotional well-being. Snooze or Lose, nymag.com/news/features/38951. A study of 4th and 6th graders showed that even an hour less sleep per night has a significant effect on a child’s neurobiological functioning, including both academic achievement and focus. Experiments across the country show that starting school only an hour later in the morning can improve everything from SAT scores to high school drivers’ accident rates. And a new study suggests a relationship between shortchanged sleep and obesity! How tired are your children today?

KIDS KORNER

The Internet is a playground for young gifted kids to learn things they never had access to before. From art to science, math to music, reading to culture—there are tons of sites for even our youngest gifted children to explore!

Check out Poisson Rouge, www.poissonrouge.com. Explore the alphabet, play the xylophone, find constellations in the night sky, search for missing picture pieces, sing a round of Frere Jacques, and experiment with numbers. No reading is required, but tons of fun are in store for our youngest learners! No matter where you are, click on the fish to take you back home.

Jackson Pollock, www.jacksonpollock.org, offers an interactive canvas, where everyone can paint like Jackson Pollock. Move your mouse to paint, and click to change the color—there’s a nearly endless number of choices! This is a tough exercise for an ordered, organized adult—but an amazing experience for a child of wonder!

The Moving Man, colorado.edu/physics/phet/simulations/moving-man/movingman.jnlp, is a Java application that downloads to your PC (it’s safe, choose “open” to run it once, or “save” to keep it on your PC for future use). The Moving Man allows you to experiment with time, distance, velocity, acceleration, and scale. Try all the controls, and see how far you can go!

San Francisco Symphony Kids’, sfkids.org, is an engaging introduction to the music of the orchestra. Experiment with instruments, learn to read music, and create your own tunes. The Music Lab offers an introduction to music, from tempo and pitch, to harmony and the symbols of music. Continue to the Performulator, and select and play your own songs, or listen to a wide variety of orchestral music on the Radio. Experiment with Instrumentation, to see how changing the parts can change the song. SFSKids is a great place to spend a musical afternoon!

Howard Hughes Medical Institute offers Cool Science for Curious Kids, hhmi.org/coolscience. Experiment with Air Junk, create a butterfly that emerges from its chrysalis, or learn to observe in a 1” Square project. Learn to classify animals by their common characteristics. And finish your afternoon of science with an experiment for dinner: create an interactive salad to learn about all the edible plant parts, then finish the experiment by shopping to make your own plant-part salad at home!

PBS Kids Fetch Games, pbskids.org/ fetch/games/index.html, is full of interactive fun. Create a WHOAHer Coaster, and make sure that it’s not only safe, but fun. Dish it Out offers an introduction to chain reaction activities—can you make the ball fall into the container? Take the built-in challenges, or create your own! Build your own Robot Rover,
and then use him to retrieve items for Ruff’s next show. Are your ears sensitive enough to crack Dog Ears safe? And visit Link-O-Vision to see if you can link all the animals and facts. You’ll be amazed what you can learn!

Math Cats, mathcats.com, offers lots of different math explorations. Can you help Math Cat sail across the river with wolf, goat and cabbage? Careful, there are some tricky possibilities! Math Cat’s OBBL Architecture Blocks are fun to build with, but they don’t stay where you put them, with often amusing results. Can you make the Math Cats balance? One cat balances with one cat, but how many ants does it take to balance with a fly? How many neutrons balance with a single carbon atom? The power of mass is amazing! And there are lots more adventures for Math Cats to explore.

Kids Web Japan, web-japan.org/kidsweb, lets us see into the culture of kids in Japan. The kids of Tokamachi Elementary School ski to school, and their school hallways are so cold they can see their breath! Check out their snow festival, and cross-country ski meet. Learn about Japanese folk legends, including Tanabata, a summer festival where people write their wishes on strips of paper and hang them on bamboo trees. Learn how to make Rice and Miso Soup, while you begin learning Japanese! And that’s just a tiny bit of this impressive cultural exploration.

Funbrain, funbrain.com/kidscenter.html, offers games to challenge your brain in math, words, and lots more. Learn to Sign the Alphabet, or read On the Rocks, the Funbrain cartoon. Try all 25 games at the Math Arcade (pick your level, grade 1 to 8), or play MadLibs at the Reading center. And don’t miss the Diary of a Wimpy Kid, but remember, it’s not really a diary, it’s a journal. (Don’t tell the kids these are educational games!)

For advanced beginners, visit Kids Genetics: A Tour of the Basics, learn.genetics.utah.edu/units/basics/tour. Here kids learn, through simple graphics and descriptions, all about DNA, genetics, heredity, traits and more. Parental warning: heredity describes the roles of the sperm and egg—you may get many more delicate questions from your kids after this part of the presentation!

The Internet: It’s not just for big kids any more!

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WEB RESOURCES: ABOUT YOUNG GIFTED CHILDREN

Appropriate Expectations For The Gifted Child
sengifted.org/articles_social/DeVries_AppropriateExpectationsForTheGiftedChild.shtml

Developing Mathematical Talent: Advice to Parents
www.dukegiftedletter.com/articles/vol6no1_taent2.html

Developing Your Child’s Habits of Success in School, Life and Work
habits-of-mind.net/pdf/Habits_of_Success_Parents.pdf

Frequently asked questions about extreme intelligence in very young children
www.gtcybersource.org/Record.aspx?NavID=2_0&rid=11375

Meeting the needs of gifted preschoolers
findarticles.com/p/articles/mi_m1053/is_v14/ai_3658754/

Snooze or Lose
nymag.com/news/features/38951

Teaching Young Gifted Children in the Regular Classroom
hoagiesgifted.org/eric/e595.html

KIDS KORNER

Cool Science for Curious Kids
hhmi.org/coolscience

Funbrain
funbrain.com/kidscenter.html

Kids Genetics: A Tour of the Basics
learn.genetics.utah.edu/units/basics/tour

Kids Web Japan
web-japan.org/kidsweb

Jackson Pollock
jacksonpollock.org

Math Cats
mathcats.com

The Moving Man
colorado.edu/physics/phet/simulations/movingman/movingman.jnlp

PBS Kids Fetch Games
pbskids.org/fetch/games/index.html

Poisson Rouge
www.poissonrouge.com

San Francisco Symphony Kids’
sfkids.org
Growing Up Gifted: Developing the Potential of Children at Home and at School (7th ed.)

By Barbara Clark
hardcover, $95.00, 547 pp.

REVIEWED BY LINDA CALVIN

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Row those dendrites! If Barbara Clark’s book, Growing Up Gifted, has a major theme, it is to emphasize the importance of utilizing the body of brain research that is continuing to emerge to support and guide us in the development of our gifted and talented youth. While waiting in Sacramento to catch my flight home recently, a stranger noticed my bag with California Association for the Gifted imprinted on it. She excused herself for interrupting my reading to ask if I could provide her with some resources, including future events and books, to help her with her 9-year-old gifted child whom she described as “not being challenged in school.” After a half-hour discussion and asking questions, she thanked me profusely for the help that I had given her, including the name of a book called Growing Up Gifted. The 7th edition of Dr. Barbara Clark’s widely used text will undoubtedly provide many with a depth of understanding about and ways to meet the needs of the gifted and talented. While Dr. Clark indicates that she wrote the book primarily for educators, she includes parents as teachers by stating that it is “for those who are teachers at home and at school.” What a fitting comment!

When I learned that Dr. Clark was working on a 7th edition, I was very interested to see how she might modify, update, and further strengthen an already outstanding 6th edition which serves as the foundational textbook and resource for gifted certificate programs in California and elsewhere. This includes the University of California Santa Barbara and California Lutheran University where I currently teach. I believe this 7th edition will become a must for use in continuing to prepare teachers and others to work with gifted and talented children. But I wondered how she could surpass a job already well done. Simply stated: The 7th edition is the best yet!

So what has changed? Dr. Clark has always emphasized and based her understanding of gifted and talented children on the continuing emergence of new findings related to brain research. With increased sophistication of technology, our ability to acquire new insights into brain functioning has been magnified many times over. Dr. Clark has captured that new knowledge and understanding and reflected it more critically and precisely to all aspects of the learning process and development of intelligence and talent in the gifted learner. As an outcome, her message is that we need to implement models that integrate physical, social, cognitive, and intuitive dimensions of brain functioning in all aspects of learning every day. The goal is to maximize appropriate growth in the gifted and talented child at all times. Her book of 12 chapters is organized around a body of available research to support the comprehensive aspects that comprise the field of gifted and talented education. She highlights the importance of understanding these children from a very holistic, comprehensive, and global view rather than segmented into activities and events to fill in the time for those who seem to finish quickly and without any challenge.

Barbara Clark’s extensive book is divided into three major parts: Part I (Chapters 1-5) provides a global understanding of the gifted and talented individual; Part II (Chapters 6-10) addresses educating the gifted student in school; and lastly, Part III (Chapters 11-12) emphasizes the importance and ways of building and maintaining effective programs and services for gifted learners.

Beginning with Part 1, her first two chapters provide the very foundation or building blocks that emphasize the importance of our understanding giftedness, talent, intelligence, and their development. For example, in Chapter 1 she reviews the overall mission and goals of gifted education and talent development and some of the barriers to achieving those goals. Significantly, she addresses the misunderstood and seemingly paradoxical concept of achieving both excellence and equity.

Dr. Clark asserts that Chapter 2 provides information that “is at the heart of understanding giftedness.” We must know the process of how intelligence develops and how we must teach in order to add to that development as an essential element in our role as teachers. She maintains that children are not born gifted, but rather, giftedness is dynamic and that progress or regression can occur depending upon what happens to and with the child. She reviews the functioning of the brain, emphasizing that the more we know about the brain, the more effective we can be in guiding, facilitating, teaching, and supporting the implementation of strategies and approaches to maximize growth in our gifted and talented children. Her theme is always that we must help “grow those dendrites”

The remaining chapters in Part I expand further the understanding of gifted education and talent development. More specifically, Chapter 3 entitled “The
Origins and Growth of Giftedness” addresses families and giftedness, the characteristics of gifted learners, and child development for gifted through adolescence. Chapter 4 looks at the social–emotional development of gifted children while Chapter 5 reviews creativity.

Part II entitled “Educating the Gifted Student in School,” includes Chapters 6-10. The major topics include assessment and identification of gifted learners (Chapter 6); optimizing learning through the use of brain research in the classroom (Chapter 7); optimizing learning strategies and modifications for gifted learners (Chapter 8); understanding, identification, and responsive teaching of racially and ethnically diverse and the economically disadvantaged gifted students; and working with exceptionalities (disabilities), underachievement, gender and giftedness (Chapter 10).

The remaining chapters (11 and 12) in Part III entitled “Building and Maintaining Effective Programs and Services for Gifted Learners” address two major areas:

1. Program models, structures and organizations at all levels for gifted learners are discussed in Chapter 11.

2. Chapter 12 provides information about the importance of developing effective gifted programs that include:

   • effective teachers and a coordinator knowledgeable in gifted education
   • a supportive advisory committee and
   • a regular process for evaluation and reflection on the maintenance and improvement of an effective program.

Without question, Barbara Clark has once again done an exemplary job in providing us with a comprehensive and research-based resource that can be used to assist all in teaching the gifted and talented in school and at home. So enjoy and help “Grow those Dendrites!”

LINDA CALVIN, Ph.D. is Associate Director of Pupil Services for the Conejo Valley Unified School District in Thousand Oaks, CA. She also teaches in the GATE certificate programs for the University of California, Santa Barbara, and California Lutheran University.

Best Practices in Gifted Education

By Ann Robinson, Bruce M. Shore & Donna L. Enersen
ISBN 978-1-59363-210-6

REVIEWED BY ELAINE WIENER

This book fits all my dreams for succinct, focused, meticulously organized, current, research-based information in gifted education. Chapters average six to eight pages long with information that gets right to the point in categories that guide your mind along the way like a roped-in line at Disneyland.

Best Practices in Gifted Education is divided into three sections of 29 chapters: Home, Classroom, and School.

You start with What We Know, and in case you did not already know, you do after you read the What We Know section. The writing style is as fine as the information is important.

The What We Can Do section hones in with very specific suggestions, and each suggestion is qualified with well-known authors in gifted education.

The references are lists of Who’s Who in gifted education and make you feel very secure in the validity of this book’s contents.

For example, here are the categories (and subcategories) in Chapter 2, Social-Emotional Adjustment and Peer Relations.

What We Know: General background, including The Family and Self-Concept, Peer Relations and Self Concept, School and Self-Concept, and Programming Considerations. Within five pages you are given a whole history of this topic from years and years and pages and pages of gifted education annals.

What We Can Do: At Home, In the Classroom, and At School. Again, all this information is concise and straight from the mouth of our experts.

Bibliography: Each chapter ends with many sources for the information in the chapter.

It’s all quite simple. These pages are so packed with important information, one wonders why other books use so many excessive words to communicate their ideas. Best Practices in Gifted Education should be your new best friend with old knowledge that you want at your fingertips!

ELAINE WIENER is Associate Editor for Book Reviews for the Gifted Education Communicator. She is retired from the Garden Grove Unified School District GATE program. She can be reached at: esw.ca@worldnet.att.net.

Strategies for Differentiating Instruction

By Julia L. Roberts & Tracy F. Inman

REVIEWED BY ELAINE WIENER

Educators in gifted education are very fortunate! We have so many books written about gifted education that it is often like going into a giant food market with too many selections. We truly need an extensive library online to categorize all these options.

One of the latest of these choices is Strategies for Differentiating Instruction. Julia Links Roberts is the Mahurin Professor in Gifted Studies at Western Kentucky University. Tracy Ford Inman serves as Associate Director of The Center for Gifted Studies at Western Kentucky University. The book lives up to the publisher’s claim: “Designed specifically for teachers new to the differentiation adventure, the book offers sound, practical advice for pre-assessing students, implementing differentiation strategies, managing student learning, and assessing student learning.”

Although the book is clearly a pre-
Let's Kill Dick and Jane

By Harold Henderson
(2006) St. Augusitnè Press
hardcover, $26.00, 176 pp.
ISBN 1-58731-919-5

REVIEWED BY ELAINE WIENER

Let's Kill Dick and Jane. What a chilling title! After all, Dick and Jane were icons in reading texts for decades. They were my childhood playmates. Although I understand the shock value of this title, I wish the title had addressed the real objective: What would be the final, effective replacement for an ineffective reading process? Despite this slight literary criticism, this is a beautifully written analysis of a mystery—the mystery of how a program so obviously wise and valuable as Open Court could be such a threat to the world of education, including other publishers and educators themselves.

This, then, is the fascinating story of a textbook publisher who, inadvertently, took on larger, established textbook publishers as well as the status quo of the whole teaching profession.

Harold Henderson is a staff writer at the Chicago Reader and was the ideal biographer of the Open Court Publishing world because he approached this mystery as the journalist that he is. Let's Kill Dick and Jane is, Reading has always been a problem in education. The texts are either too difficult or too easy, depending upon the backgrounds of the students in the classroom. The creators of the Open Court reading procedure had a precise process which they believed could teach reading to all levels of students while enthraling them with marvelous literature. (This was very advantageous for gifted students in regular classrooms or even in gifted classrooms where reading levels always were varied.) And this was no small task. Open Court required diligent in-service for teachers. It also necessitated commitment and belief in the concept. That, too, was no small task.

This fine idea should have been welcomed as a successful approach to how to teach reading. The program should have been allowed to prove itself on a large scale—as it did in small arenas over and over and over again. It should never have had to go through the trials and tribulations it experienced, ending up by selling to a competitor to avoid bankruptcy. This story is a blow on the education profession!

The story of Open Court speaks for itself in the following thoughts:

‘Traditionalists’ in education value order, intellect, and excellence...They gravitate toward movements like phonics in beginning reading and back to basics in math.

‘Progressives’ in education value freedom, self-expression, and equity...They gravitate toward movements like look-say or whole language in reading and constructivist math.

Harold Henderson points out that each of these philosophies has a firm grip on only part of the truth. He makes us aware that...thoughtful educators, regardless of label, seek to develop their students' intellect and character.

Furthermore, This book argues that American public education is dominated by a culture that resists both ideologies, a culture that maintains a status quo that is mediocre by either standard.

American schools have not deteriorated—they've never been good enough.

We have been through so much in the education profession with so much outside and inside interference. At this point there is no blameless group...and perhaps because of that we really can't blame anyone. And while we are not blaming anyone, we also can't seem to solve anything.

What should be means becomes ends in themselves, while the ends are neglected.

This whole story reminds me of an old saying:

When you're up to your eyeballs in alligators, it's difficult to remember that your original objective was to drain the swamp.

Also be aware that it is to the McGraw Hill Publishing Company's credit that they stayed pure to the teachings of Open Court and have made a success of publishing the books after they bought the company in 1996.

ELAINE WIENER is Associate Editor for Book Reviews for the Gifted Education Communicator. She is retired from the Garden Grove Unified School District GATE program. She can be reached at: esw.ca@worldnet.att.net.
Gifted Education Communicator

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Gifted Education Communicator

Information and practical solutions for parents and educators

Gifted Education Communicator is designed to be a practitioner’s journal—providing you with the information and strategies to apply the theory, research, and best practices in the field. Noted leaders and experienced parents address a broad range of themes and issues related to educating and parenting the gifted. The high quality of articles has made the journal a highly respected publication in the field of gifted education. You’ll find these regular features in each issue of Gifted Education Communicator:

• Feature theme articles by national leaders in the field
• Parent Talk
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UPCOMING THEMES: Spring—Understanding and Applying Brain Research; Summer—Parenting Gifted Children; Fall—Interdisciplinary Studies: Visual/Performing Arts
Coming to the
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The official release of CAG’s new book in collaboration with Free Spirit Publishing,

**Expert Approaches to Support Gifted Learners**

Practical, fundamental information about the needs of gifted learners of all ages.

Educators and parents need practical information they can use now to help them best understand and support the gifted learners in their lives. Because of the unique social and emotional needs faced by gifted learners—not to mention the unique academic needs—teaching and parenting them can be as demanding as it is rewarding.

These 36 articles provide much-needed help. They are a “best of” from the last seven years of the *Gifted Education Communicator*, the national publication of the California Association for the Gifted. With contributions from respected scholars as well as new experts in the field, this book is sensitive, positive, and packed with ideas and up-to-date facts.

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“If students don’t learn the way you teach, teach the way they learn”

— unknown

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