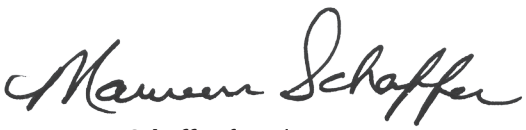
Dear Liberty Community,

We are on a journey of education; a quest to develop mind, heart, skills and knowledge in our children. The journey, a life-long endeavor, implies responsibility for one's own education. We set the example for our children. To help accomplish the quest, a dedicated group of school founders, administrators, and parents has compiled this collection to point the way. This assembly of articles introduces many of our philosophies, providing background on how the school functions and why. Please read the collection. It will enhance the journey.

Kind regards,

Bob Schaffer, founder and Headmaster
parent of five



Maureen Schaffer, founder
parent of five

Ruth Ann Everett, founder
parent of five

Laurel Van Maren, founder
parent of five

Torgun Lovely, LCHS Principal
parent of two

Casey Churchill, LCS Principal
Plato Campus

Tricia Diehl, Board Member
parent of three

Sandy Stoltzfus, LCS Principal
Aristotle Campus
parent of one

It is the right and responsibility of parents to direct the education and upbringing of their children.

Liberty Common School
Mission Statement

The mission of Liberty is to provide excellence and fairness in education for schoolchildren through a common foundation by successfully teaching a contextual body of organized knowledge, the skills of learning including higher-order thinking, and the values of a democratic society. Liberty recognizes the value of inclusiveness, or providing access to a broad cross- section of the community, so that students from all backgrounds can benefit from Liberty's educational offering. Liberty acknowledges the leadership of teachers in the classroom, and recognizes the responsibility of each student for his/her academic effort.

—Established February 24, 1997

Special Thanks. We are grateful to Liberty Common School parent **Mrs. Heather Jackson** of HJackson Designs for graphic design and production of this document; and we heartily recommend anyone needing professional graphic-design services to patronize her excellent business. Ms. Jackson can be reached by email at: HeatherJacksonDesigns@gmail.com

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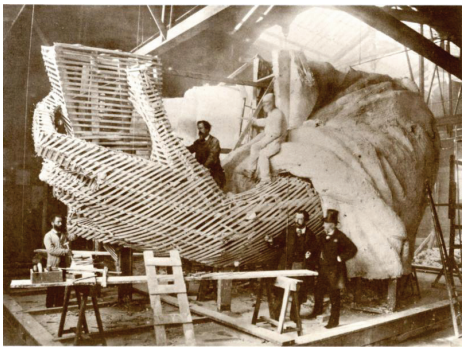
Forward

Liberty Common School has a unique history important for all to know. There were many hardships and roadblocks encountered along the way. The Founders persevered to make our school what it is today, but it wasn't easy. We are fortunate to have had such persistent pioneers with a vision to make one of the best charter schools in America.



Liberty Founder **Dr. Maureen Schaffer** detailed the events that took place to develop Liberty Common School as we know it. Our hope is that by sharing our history, we will better value the efforts by our Founders to get where we are today. It is because of their vision and foresight that we have the top elementary and high school in the state of Colorado.

We continually thank our founding parents for their hard work and dedication. We could not have asked for a better educational system to educate children. Our hope is that you feel the same.

The History of Liberty Common School

Dr. Maureen Schaffer, parent and founder

Liberty first opened its doors in September of 1997, but the story of Liberty Common School dates back much further.

In the early 1990s, true educational choice was non-existent in Poudre School District. Parents without resources for private school sent their children to neighborhood schools. Nebulous curricula were largely determined by individual classroom teachers, leading to gaps and repetition in student learning. Dissatisfied, small groups of parents began to read, research, and meet throughout PSD in search of better options.

One young couple, with a seemingly insatiable interest in education issues, emerged with a solution. After months of research, **Dr. Randy Everett** and his wife, **Ruth Ann,** identified several fundamental elements they believed most parents desired in their children's schooling:

- Parental choice in education.
- A core curriculum of specific content knowledge.
- Solid, content-driven skill instruction.
- Teaching the values of a democratic society.
- School-based management.

Randy and Ruth Ann took their message on the road, placing advertisements in the local paper, and speaking in living rooms and meeting halls throughout the county. Soon, hundreds of parents had joined the cause.


Dr. Randy Everett

In the spring of 1993, Dr. Everett submitted a proposal to the PSD Board of Education to establish an "Elementary School of Choice" organized around the relatively new Core Knowledge Sequence. The educational community fought the proposal with gusto. District teachers testified before the school board, pronouncing the Core Knowledge Sequence too difficult to teach or learn.

Despite this strong opposition, the school board approved Dr. Everett's request, and the Washington Core Knowledge School (later renamed Traut Core Knowledge School) opened with 125 students that fall. This progressive episode in PSD's history is documented on pages 62-63 of *The Schools We Need* by **E.D. Hirsch**.

Washington Core Knowledge School flourished. Parents painted the run-down school building and gathered curriculum resources. Courageous teachers joined the team, and students began to outperform their peers at neighborhood schools. Within two years, enrollment had nearly doubled, and the waiting list numbered in the hundreds.

To meet this high demand, the school board allowed Washington Core to further increase enrollment and move into a portion of the old Fort Collins High School building at 1400 Remington Street (today, this building is CSU's University Center for the Arts). In a monumental construction effort led by parent volunteer **Mrs. Carol Christ,** the high-school building was converted to an elementary school over the summer of 1995. Things were going well for Washington Core, or so it seemed.

In the fall of 1995, the school district informed Washington Core its (never-before mentioned) "two-year pilot program" had ended. Faculty would now be determined by

the district, rather than the school's parent board. Sadly, the district immediately fired two teachers, replacing them with "tenured excess" teachers from within PSD.

The founding parents were dismayed. How could the school retain its integrity, if PSD brought in teachers who were not committed to the school's curriculum? Fortunately, the Colorado legislature had provided an answer – the Charter Schools Act.

~

The huge demand for the educational program offered at Washington Core Knowledge School prompted the school's founders to begin drafting an application for a Core Knowledge charter school, under the newly passed Colorado Charter Schools Act. By the summer of 1995, unresolved issues about the permanence of Washington Core and the authority of the parent board over the academic program spurred a full-scale charter effort.

Meeting after work and on weekends, parents meticulously defined and documented the charter school's mission, goals, curriculum, governance, budget, facility plan, employee relations, and more. On October 31, 1995, the Core Knowledge Charter School (CKCS) Partnership, the organization formed by founding parents for the purpose of establishing a new charter school, submitted its application to the PSD Board of Education.

Rather than proceed with negotiations, the PSD board requested more and more information, explanation, and detail. The CKCS board, led by parent **Chairman Phil Christ,** diligently responded to each request, but to no avail. On December 11, the PSD board voted to deny the charter application without ever having met to negotiate with the parents.

Undaunted, the CKCS board appealed the decision to the Colorado State Board of Education. In February, the State Board sided with the parents and instructed the PSD board to negotiate an agreement in good faith with the charter group. Weeks of meetings ensued.

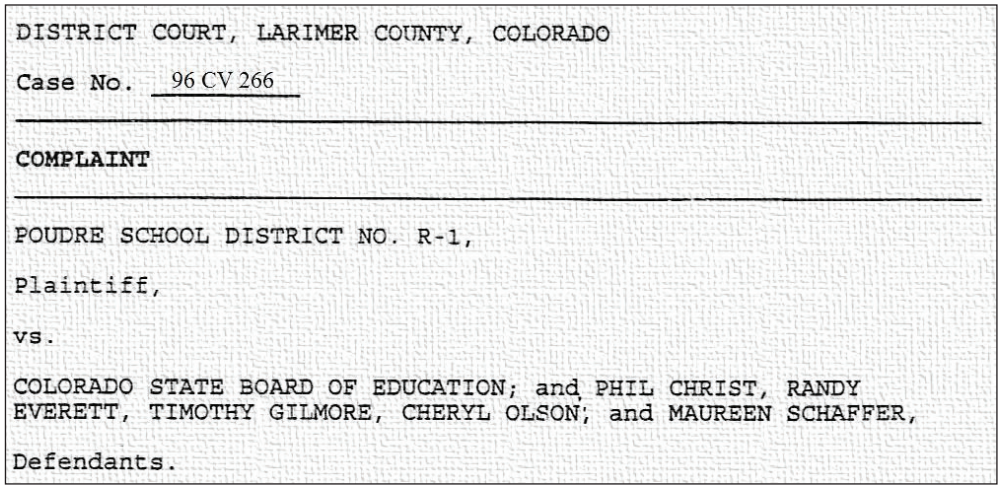
It appeared the two sides were slowly coming together. However in an eleventh-hour surprise, the PSD board suddenly voted to "approve" the charter with several major restrictions, not previously discussed: The charter would be limited

to two years, enrollment would be capped at 300 students, and the school would be limited to a K-6 program, thereby eliminating the school's innovative junior-high program.

PSD further directed the charter school to find space in a non-district building and execute the charter contract with PSD no later than June 1. The constraints made it virtually impossible to open the school.

Disappointed, the CKCS board filed a second appeal with the State Board of Education. In an apparent attempt to quash the charter school, PSD unleashed its attorney. A paper war erupted as the lawyer threw legal obstacles in the path of the charter school. The charter group managed to fend off the legal challenges and was finally granted a hearing before the State Board.

At the April 23 hearing, the final punch was landed when PSD announced it had filed suit against the State Board of Education and CKCS Board of Directors! Concerned the lawsuit could result in an injunction preventing the charter school from opening, the State Board recommended the charter group try to open a school with PSD's restrictions.



DISTRICT COURT, LARIMER COUNTY, COLORADO

Case No. 96 CV 266

COMPLAINT

POUDRE SCHOOL DISTRICT NO. R-1,

Plaintiff,

vs.

COLORADO STATE BOARD OF EDUCATION; and PHIL CHRIST, RANDY EVERETT, TIMOTHY GILMORE, CHERYL OLSON; and MAUREEN SCHAFFER,

Defendants.

From page 1 of PSD's lawsuit against charter school parents filed in Larimer County District Court April 22, 1996.

Dozens of outraged parents criticized the legal shenanigans at the next PSD board meeting. PSD director **Bob Bacon** (who subsequently was elected a Colorado State Senator) denied the district had sued parents and accused charter supporters of promulgating a big lie. But PSD President **Mike Liggett**, an attorney, confirmed the lawsuit had indeed named five parents—**Phil Christ, Randy Everett, Timothy Gilmore, Cheryl Olsen,** and **Maureen Schaffer**—as defendants.[1]

The clock was ticking down to the June 1st deadline. Charter parent **Mr. Peter Kast,** a commercial realtor, conducted yet another survey of potential properties to accommodate

[1] Vaughan, Kevin. "Parents assail board over charter school." *The Fort Collins Coloradoan,* May 14, 1996.

the PSD-imposed school configuration. A near match was identified. However, two adjustments to the restrictions would be necessary:

1) Increase the charter length to five years to amortize building improvements.
2) Increase the enrollment cap to 364 students to meet the annual lease and maintenance obligations.

The charter group entreated PSD to consider adjusting the restrictions. The PSD board refused to consider the request. "The Board of Education will not take any further action," came the response in a May 3rd letter to the CKCS board.

The June 1 contract deadline expired, and PSD dropped its lawsuit against the parents.

The clock had run out. There would be no charter school in 1996.

It was June of 1996. Advocates for the Core Knowledge Charter School had come up short after being legally out-maneuvered by the school district. The parents faced a $5,000 debt for legal filings and newsletters to its growing list of supporters.

The unsinkable charter group wasted no time mobilizing its next charter effort. It "passed the hat" yet again, this time requesting additional donations to hire a lawyer of its own.

The parents contacted local attorney **Mr. Mike Maxwell** to assist in rewriting and negotiating their charter. Maxwell was immediately captivated by the critical nature of the school choice movement. He and his partners donated their time and expertise to the cause.

The name of the new school would be Liberty Common. Why? At a *common* school, students of all ages and socio-economic backgrounds could obtain a common education.

But, why *Liberty*? *Liberty* stood for parents who would now have educational choice. *Liberty* stood for teachers who would no longer have to work in a broken system. And most importantly, *Liberty* would symbolize the true freedom that can only be achieved when a student possesses an educated mind.

On October 1, 1996 the charter application for Liberty Common School was submitted to PSD, along with a file drawer of supporting documents, reports, and studies. The new charter provided in-depth rationale for each aspect of the school the parents deemed non-negotiable. Still, negotiations dragged on for months.

Finally PSD approved the charter, and a five-year contract was signed on February 24, 1997. Now, the real work would begin!

The charter group scrambled to simultaneously find a building and hire staff. Teams of parents conducted interviews at the offices of Dr. Everett's urology practice. (Applicants were quite relieved to learn physical exams were not part of the drill!).

Although there was still no school building, one courageous administrator, **Dr. Kathryn Knox,** took a gamble and signed on as Liberty's first headmaster. She quickly melded with the team and donated dozens of hours interviewing potential teachers.

A powerhouse staff with a pioneering spirit was assembled, including **Dave Lunn, Cherie Pederson,** and **Jeff Siener,** who are all still cornerstones of Liberty today. Teachers joined forces with parents to identify curriculum resources and skills programs to augment the Core Knowledge Sequence.

Meanwhile, parent Peter Kast, worked fervently to pull together a suitable building and financing for the new school. Pursuing multiple deals simultaneously, Peter never gave up as each financing option ultimately collapsed. Would anyone lend money to this unknown entity called a charter school?

It was now summer and fall was fast approaching. A building was needed immediately if there was to be sufficient time for renovations. Peter assembled a small group of investors to purchase the Colgate factory near the detention center and lease the building to the charter school. The deal closed in late June.

The facility question was answered, but substantial reconstruction was necessary to convert the former toothpaste and mouthwash factory into a school. Thirteen Liberty families put up personal assets as collateral for the million dollar construction loan. It was now July.

Amazingly, due to the support of former PSD Board President **David Neenan,** his construction firm, the Neenan Company, completed the massive remodel in less than 60 days!

The concrete floors were bare, and the upstairs remained unfinished. A support column stood in the middle of the small gym. The performance hall, wood gym, art rooms, and track were non-existent. But none of that mattered.

In September 1997, a dream became a reality as Liberty Common School opened its doors to more than four hundred eager young students in kindergarten through 7th grade. And the rest is history!

The History of Liberty Common High School

Mrs. Michelle Provaznik and **Headmaster Bob Schaffer,** founding parents

In May of 2013, Liberty Common High School graduated its first senior class. This was the culmination of an epic effort started in 2008 when Liberty Board of Directors Chairman **Craig Horton** and Board Member **Michelle Provaznik** attended a charter-school conference in Denver.

The information the pair gathered at the conference, along with general statewide excitement about the growing success of charter schools in Colorado, provided impetus to explore expanding Liberty Common School to a full K-12 school. Also attending the same conference was LCS founding parent, **Laurel Van Maren,** who was on Ridgeview Classical School's Board of Directors at the time. The three discussed moving forward with a Liberty high school and began meeting for the purposes of laying out general plans for the school.

This was not the first time Liberty's parent leaders considered a high-school expansion. In fact, the idea had been pondered twice before, but failed to garner enough support from the Board of Directors or administration due to a variety of issues including financial feasibility.

In 2008, things were different. Liberty Common School's kindergarten-through-ninth-grade program had been awarded numerous state and national commendations for academic achievement. The school's students consistently earned top academic-performance scores in the Poudre School District, and across Colorado. The school had achieved national "Blue Ribbon" status, and was regarded as a premier nationwide example of excellence by the Virginia-based Core Knowledge Foundation.

Liberty's reputation as a nationally known, top-performing school naturally attracted the attention of new parents throughout the region. Enrollment had swelled to 581 students in grades K-9. The school was more than completely full. The number of families on the lottery list waiting to enroll their children at Liberty numbered well over fifteen-hundred.

That year, the Board of the Poudre School District voted to change the grade configuration for neighborhood junior-high and high schools throughout the district. Where the district's high schools previously consisted of grades 10–12, PSD's high schools would now expand to include ninth graders.

The change in the district's configuration would apply direct competitive pressure on Liberty's ninth grade. The writing was on the wall: Liberty either needed to expand to include a high school, or watch its ninth grade wither on the vine.

Horton and Provaznik, with the support of Van Maren, presented their high-school ideas to their colleagues on the Liberty Board of Directors. Though the initial response was lukewarm, the Board formed a committee to explore and evaluate the feasibility of expanding the school through twelfth grade. Horton was selected to chair the Expansion Committee.

The Committee's first step involved holding a community meeting. In October of 2008, a notice went out to all parents about the idea of creating a high school. Over 80 people attended the meeting.

Not only were parents of Liberty students interested in the formation of a high school, prospective Liberty parents were interested in the addition of more K-8 classrooms (one additional classroom per grade) in the hopes their children might be called from the extensive lottery list to fill new slots (30 new students per grade) that would be created.

The goal of the Expansion Committee was to create a comprehensive business plan to prove the feasibility of the whole-school expansion. Seven subcommittees were formed, involving over fifty parent volunteers. The subcommittees were chaired by the following parents:

Athletics: **Dan Knab**

Character Education: **Mark Sutherlin** and **Kendra Mosely**

Curriculum: **Michelle Provaznik**

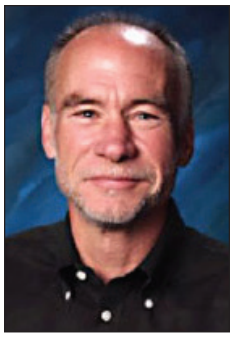
Facilities: **Tricia Diehl** and **Peter Kast**

Finance: **Dan Provaznik**

Marketing/Enrollment: **Melanie Seilbach**

Scheduling: **Angela Horton** and **Krissy Kopren**

The subcommittee efforts centered upon creating a high school from the ground up. At the time, there was no blueprint or instructions to refer to, so the committees performed extensive research to develop curriculum, sports programs, campus policies, facilities, etc. The goal was to avoid any compromise of Liberty Common School's core mission-teaching the kids already in its system.



Tim Ricketts, *(right) former business manager of Liberty Common Schools, worked with the BOD finding complicated financial solutions that allowed the high school to become a reality.*

While much of the expansion effort focused on the high school, the largest part of the expansion was, in fact, the addition of a third track for the grades K-6, which increased elementary-school enrollment and staff by 50%. The needed classroom space for the enrollment jump necessitated moving grades 7-12 to a second campus.

Another public meeting was held on January 6, 2009, to gauge community interest. Many parents were interested in the expansion and signed their students up for the waiting list. Several members of the Poudre School District (PSD) Board of Directors also attended the meeting. Their initial reaction seemed supportive. That mattered. If the expansion was to occur, PSD's approval would be required.

Ultimately, at a meeting of the Liberty Board of Directors, administration, and parents on February 5, 2009, the Expansion Committee recommended Liberty expand and add a high school. The Committee's presentation showed that not only was the expansion feasible, but Liberty would, in fact, be in financial jeopardy if the ninth grade was lost at the hands of PSD's plans for grade reconfiguration.

With very conservative enrollment estimates, the findings showed that expansion of grades 9–12, simultaneously with the addition of a third track of K-8 was not only possible, but would allow Liberty to thrive. The Expansion Committee was thrilled to have founders **Dr. Randy Everett** and **Dr. Maureen Schaffer** speak in favor of the expansion.

On February 19, 2009, Liberty's Board petitioned the Poudre School District to amend Liberty's Charter and to add a third track of K-6th grade, a tenth grade, and to also phase in an eleventh and twelfth grade in subsequent years.

A resolution adopted by the Liberty Board of Directors said it all: "The purpose of completing our high-school program is to offer high-school education that is college preparatory in nature, specifically builds on the Core Knowledge Curriculum, effectively continues to foster the reading, writing, mathematical and thinking skills particular to Liberty's current offering, continues the Liberty approach to character education, is small in size, extends the economics, history, science and mathematics foundation that Liberty has established, and makes use of learning opportunities inherent in the thinking framework currently employed at Liberty."

Many exchanges and meetings between the district and Liberty ensued. Craig Horton, Michelle Provaznik, and **John Rohrbaugh** were asked to present the case for the Liberty expansion at a PSD Board meeting. Ultimately, the PSD Board agreed to pursue negotiations with a vote of 6–1. Final negotiations proceeded.

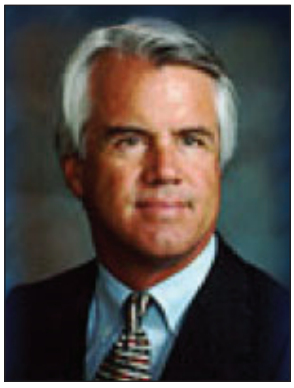
In August of 2009, Liberty received a letter from PSD's Board president **Larry Neal** indicating the district was pleased to move forward on an addendum to the Charter allowing the expansion and the new high school to go forward.

Even though the district had formally approved the expansion, implementing it was hardly a foregone conclusion. An acute economic recession had stricken the nation and hit Colorado's School Finance Act pretty hard. All public schools in the state were notified there would be a punishing rescission of previously allocated state funds—funds upon which Liberty was counting. Furthermore, it was announced the state would reduce spending for the next year on the order of 6% or more.

Tim Ricketts, Liberty's business manager was asked to run multiple versions of financial scenarios anticipating every conceivable budget situation. The Board had to make a serious decision involving a long-term financial commitment amid the funding rescission, the budget reduction, and a precarious economy.

The central question was obvious: Now that Liberty has the authorization to expand, could it afford to actually do it given the dire financial situation and the volatile economy at hand?

Convinced there is no greater priority than the education of their children and buoyed by the strong support for a high school among the Liberty parent population, the Board decided to go forward with the plan. Though optimistic, the Board instructed the administration to build a high school while pinching every penny in order to make the finances work. Salaries for all Liberty personnel were frozen until further notice.



Peter Kast, (left) who negotiated and secured Liberty's flagship elementary-school building, answered the school's newest call for help in finding a suitable building; and the search for a new high school facility was on.

What shall the high school be called? After convening student focus groups and consulting the parent population, it was decided to stick with a brand name that carried with it a nationwide reputation for academic excellence: Liberty Common High School.

The school would offer a classical liberal arts curriculum building upon the Core Knowledge Sequenc e, and it would accentuate math, science and engineering. Committees of parents were convened to further develop the curriculum and the course schedules.

*Director of the Elementary School **Casey Churchill** (right) organized the move from LCS to LCHS and the expansion at LCS. It was an enormous undertaking of brilliant coordination.*

Public meetings were held to describe the school, its goals, and plans. Administrators described the kinds of teachers they would hire, and who from the current school would go to the high-school

building. A relaxed high-school Dress Code was developed and elated 9th graders were allowed to try it out for their second semester at the old Liberty Elementary School.

The House System was developed. Eighth and ninth graders committed to attending LCHSwere assigned to one of three Houses: *Domus Scientiae, Domus Virtutis* or *Domus Prudentiae.* They began working on House projects such as House crests, logos, mottos and events.

Still, one question loomed over all of these discussions and activities: Where would the new high school be located? Hopes for a high school property adjacent to the current school were fading. Visions of a single Liberty campus were becoming dim. All options considered turned into dead ends. The proposed school was now well into 2010—the year the high school was scheduled to open, but there was no building in hand.

One mile south of the elementary school stood a building that had been occupied by a defunct charter high school for a few years and had been abandoned for a few more years since. Would that building work?

Peter Kast approached the building's owners, and obtained a key allowing the Board to wander through the dusty vacant facility. After the walkthrough, the Board huddled in the parking lot looking on the abandoned school as the winter sun set over its roof. The group began mulling numbers and options. If the price came down, with some remodeling, and with additional classroom expansion over a few more years, this location could work. The Board decided to pursue the building at 2745 Minnesota Drive, and to continue searching for other options.

It quickly became apparent the poor economy looming over Liberty's expansion was simultaneously working to the school's advantage as a buyer in the real-estate market. The price of the building was, by the month, dropping further below its original asking price. With the help of an investment corporation FCCS, LLC, headed up by local developer and charter-school backer **Troy McWhinney,** a solution materialized allowing Liberty Common School to lease the building and purchase it a few years later.

*LCHS opened under the guidance of Director of Secondary Schools **Bob Schaffer** (right) who was soon after named high-school principal by the Liberty Board of Directors.*

Tenancy stretched Liberty's budget to its limit, but the numbers added up— barely. With solid enrollment and aggressive fundraising, the Board believed it could make ends meet.

A Letter of Intent was signed in February of 2010. Once an agreement was finalized, the landlord opened the building right away so parents could take a tour. From that moment, excitement punctuated all the work and countless hours required to get the building ready to open by August 18th of 2010.

Teachers needed to be hired. After attending numerous job fairs and accepting applications from around the world, a first-rate team of LCHS educators was assembled.

The high school's roster of inaugural instructors was announced: **Jared Dybzinski, Dr. Charles Hubbeling, Dawn Karr, William Kranz, Kay Lannen, Jerry Lavin, Torgun Lovely, Duane Staton, Dr. Barbara Werner, Ken Vetter, Sarah Aguilar-Francis, Megan Ellis, Connie Logsdon, Dave Lunn, Susan Porter, Donny Reeves, Wade Torgeson** and **Erin Voorhies.**

The Chairman of the Colorado State Board of Education, former U.S. Congressman, former State Senator, and founding Liberty parent **Bob Schaffer,** who had been hired as project manager for the high-school expansion, was named Director of Secondary Schools. Along with Liberty's headmaster, the school's new administration would direct the opening and operation of Liberty Common High School. (In 2011, Schaffer was named LCHS principal and in 2019 LCS Headmaster).

Architects and contractors worked feverishly throughout the summer remodeling the building. The administration shopped at auctions for used school furnishings and equipment.

Director of Elementary Education (later named principal) **Casey Churchill** orchestrated "the big move." Classroom supplies and furniture were boxed up, labeled, and carted off to the new school.

Hordes of volunteers showed up (on what always turned out to be the hottest summer days) to unload trucks and set up classrooms. New lockers—cherry red

ones—were ordered and would eventually line the empty hallways (The lockers did not arrive until two months into the school year. There was no carpet in the school until the second semester).

New lunchroom tables were ordered, too. There was no turning back now. LCHS would open on time with its leading class of 10th graders. In three years, these pioneering students would become Liberty's first graduating class—the inaugural Class of 2013.

The night before LCHS was set to open, students grades 7-10 came together at Liberty Elementary School for the last time. Elementary Principal Churchill made remarks encouraging the excited students assembled there, and then lit a ceremonial lantern that was carried by student leaders at the head of a 2.2-mile long procession along the Poudre River then West up to the high ground upon which Liberty Common High School sits.

The lantern carried the flame of Liberty's first "Torch Trek." The traditional event has been reenacted by Liberty students each year since.

Congratulations! You Own Liberty.

Bob Schaffer, founder and Headmaster

A rather active parent of longstanding membership in the Liberty community asked me once, "So, who actually owns Liberty?" Yes, I suppose the answer is confusing, but it's quite important nonetheless.

Parents own Liberty. But how we own it is an intricate construct: Liberty's ongoing academic operations are public; yet, the school's land, buildings and furnishings are private.

Let's start with the public side. Our "charter" is effectively an academic operating agreement between Liberty's parents — represented by our Board of Directors — and the Poudre School District, which is a subdivision of the state. As a charter school, Liberty's authority to exist is Colorado's Charter Schools Act (Article 30.5 of Title 22 for you attorneys). This law characterizes our operational and academic function (the "teaching" part) as a public, yet semi-autonomous, school.

Members of Liberty's Board of Directors (BOD) are elected from the greater parent population. They are volunteers — crucial ones. They are the legal officers of the public part of Liberty — the entity responsible for carrying out the operational and academic functions as defined in Liberty's charter.

Members of the BOD are the parent representatives chosen by the rest of us parents to maintain our parental ownership of our school. As such, Liberty is not owned by the Poudre

School District. It is not owned by the state. It is truly commonly owned by the parents of students who attend Liberty.

Now to the private side of Liberty: What some find surprising is that Liberty's buildings and school grounds are actually owned by a private, non-profit, corporation made up of a few of Liberty's original founders and one newer Liberty parent. Knowing Liberty's history is instructive here.

Liberty's original founding parents and initial investors put up their own private funds to buy our first building. Shortly thereafter, they formed the same non-profit corporation that today owns our buildings and the land upon which they sit.

This corporation is in fact a different entity than the one run by our more public BOD. This private building corporation exists for one reason alone — to provide land and building space for Liberty Common School at the lowest possible cost.

So, in delivering Liberty's academic program, the BOD (again, acting on behalf of all us parents) actually rents our buildings from Liberty's private building corporation. The funding to pay the rent comes primarily from money the Poudre School District pays to Liberty, in accordance with our charter, in exchange for Liberty educating some of the district's school-children — specifically, those choosing to attend Liberty. Funds not spent on rent, go to paying teachers, buying books, replacing supplies, maintaining computers, and keeping the lights on.

It's a win-win arrangement. On one hand, the district does not buy, own, or maintain our facilities (like it must do for regular public schools).

On the other hand, the autonomy and parent ownership created in the Charter Schools Act allows Liberty the flexibility to design a more focused, purposeful, and ambitious school, and to operate it more efficiently. Our kids get a far better education for considerably less cost.

It also empowers us to be more confident stewards of Liberty's future. When we need more money for equipment and improved facilities, it is our duty as parents to do just like our founding parents did, and just like Liberty families have done ever since: We make the case, debate the merits, make some bold decisions, and ultimately pass the hat to get it done right.

The reality that parents actually own Liberty really matters. Our BOD and school administration have initiated various parent-led committees and subcommittees to define strategies for building improvements, better classroom supplies and materials, better science, computer, art, and music accommodations, better financial rewards for our most valuable instructors, and a few more enhancements.

There's no debate about whether ongoing improvements are needed for our entire K – 12 programs. What is still always up for discussion is how best to plan, finance, and move forward on the maintenance, improvements, and faculty compensation we need for the foreseeable future of our constantly improving enterprise.

If you'd like to participate in this vital level of planning, leadership and ownership of Liberty, please contact any Member of the BOD, or one of our school administrators, and we'll put you to work.

In the meantime, spend some time evaluating the true worth of our world-class K-12 charter school. Consider the value of an efficiently run institution that has a long and well-respected track record of being frugal and prudent with every dollar it spends.

Consider Liberty's remarkable history, and how dedicated parents always manage to pull together to give our children every academic advantage they need to be themselves prosperous in life. And never forget who the real owner of Liberty is, and who will ultimately determine its future success.

Liberty is not owned by PSD. It is not owned by the State. It is owned by us — all of us parents who are blessed to educate our kids here. Liberty is our responsibility.

Hiring the Best Instructors

Bob Schaffer, founder and Headmaster

Liberty's team of classroom instructors is widely regarded as being among the nation's best. Our school's rigorous screening and hiring processes contribute to the school's history of consistently attracting and retaining high-quality instructors in classrooms spanning kindergarten through twelfth grade.

On a near-weekly basis, school leaders from throughout the state and country (and on a few occasions, from other nations) visit Liberty to observe our instructors in action. The first questions these visitors pose are almost always the same: How do you find these outstanding teachers, and how do you persuade them to work here?

Liberty Common School hires only the best professionals in their field and scope of practice. All applicants are thoroughly and rigorously screened before even being considered for employment.

An applicant's philosophical alignment with the school is crucial. The sixth of seven principles upon which Liberty Common School's Mission Statement is derived asserts:

> *Teachers are professionals. This implies considerable autonomy, mastery, and independence. Having accepted the academic and philosophic mission of a school, the teacher needs to be free to exercise informed judgment in order to fulfill his or her primary role as an educator.*

As a charter school, Liberty employs all instructors, administrators and support staff on an "at will" basis. All employment contracts are individually negotiated with each instructor.

This means Liberty instructors are hired on a truly professional basis (not on a union-wage scale) earning compensation commensurate with their contribution to the organization and professional growth as determined by thorough and routine professional evaluations. Annual pay raises are a direct function of demonstrated classroom performance and institutional leadership.

Holding a state teacher license is not required for employment at our school. We agree with 2012 findings of Colorado Commissioner of Education **Robert Hammond** and State Director of Professional Licensing **Dr. Jamie Goetz** that a state-issued teacher license is not an indication of one's ability to teach and is unreliable in affirming one's instructional competence.

When Liberty posts job openings, we stress first and foremost the importance of content expertise. We prefer teachers whose fields of study align with what they will teach to our students. We recruit in atypical ways.

For example, when we need an economics instructor, we contact business schools at multiple universities and spread the word directly to economics majors and graduates. We contact academic institutions, policy organizations and think tanks, even specific prominent college professors we think might best help us alert top candidates to our job posting.

To get an interview, an applicant must demonstrate strong background knowledge and an appreciation of classical methods of education and curriculum. We require a letter of application, a current resume, college transcripts, professional references, and a statement of educational philosophy. As a result, we typically receive applications from throughout the country for job openings at our school.

Our interview panels are comprised of key administrators, Members of the school's Board of Directors, school founders, grandparents, and parents with professional expertise relevant to the discipline for which we are hiring.

The first portion of our interviews covers education philosophy and pedagogy. Then we quickly dive deeply—very deeply—into the most important part of the conversation—content expertise.

Our interview documents guide us through fundamental and expert-level academic questions. Interviewees must demonstrate legitimate mastery of their subject matter, and they must be articulate in their explanations.

Our inquiries plumb the depths of an applicant's academic preparation and training. We simultaneously assess how clearly they explain things. Do they communicate like an adept teacher?

We also mind what a potential employee believes about the principles of education. Is it more important that students commit key information to memory, or be able to find it when needed? What is the proper role of parents in a school? Do you embrace the school's foundation-stone and capstone virtues? If so, how should these virtues be reinforced through curriculum, in the classroom, and throughout the school?

Our interviews can last a couple hours; often more. On the school's YouTube Channel you can find a video of LCHS instructors recalling their personal experiences interviewing and becoming an instructor. It is quite revealing, and certainly worth watching.

Those who rise to the top of our interview process are often asked to return to the school and teach a demonstration lesson to our students. Adult observers typically line the back row of the classroom taking notes and critiquing the performance. Participating students fill out a survey after the lesson indicating which aspects of the mock lecture, in their opinion, had the greatest impact. The lesson is videotaped.

Once we are confident we have divined our top teacher candidate, an invitation is extended to join our organization, and a compensation offer is tendered. Upon acceptance of agreeable terms, we announce to the school community the addition of yet another out-standing member of the Liberty Common School faculty.

The Knowledge Connection

E.D. Hirsch Jr., *The Washington Post*

Why has the No Child Left Behind law left so many children behind? According to the latest scores from the National Assessment of Educational Progress (NAEP), the reading achievement of eighth-graders has declined since the law was passed in 2001, and the large reading gap between advantaged and disadvantaged children —"the achievement gap"—has stayed where it was. Today's eighth-graders had recorded gains in fourth grade, but these have not led to improvements in later grades—when reading scores actually count for a student's future.

Those in Congress in charge of crafting revisions should understand that the law's disappointing results owe less to defects in the law than to the methods and ideas schools use in their attempts to fulfill the "adequate yearly progress" mandate for all groups of students; this causes schools, as many complain,to teach to reading tests rather than educate children. But intensive test preparation by schools has resulted in lower reading test scores in later grades. "Teaching to the test" does not effectively teach to the test after all.

Studies of reading comprehension show that knowing something of the topic you're reading about is the most important variable in comprehension. After a child learns to sound out words, comprehension is mostly knowledge. Many technical studies support the assertion that after students can fluently sound out words, relevant knowledge is the crucial difference between students who are good or poor readers. In light of the relevant science, an analysis of the textbooks and methods used to teach reading and language arts—for three hours a day in many places—indicates some of the reasons for the disappointing later results. These test-prep materials are constructed on the mistaken view that reading comprehension is a skill that can be perfected by practice, as typing can be. This how-to conception of reading has caused schools to spend a lot of unproductive time on trivial content and on drills such as "finding the main idea" and less time on history, science and the arts.

That educators hold this view of reading comprehension is not entirely their fault. They have depended on the authoritative Report of the National Reading Panel (NRP), published in 2000, which, for all its good advice on teaching students how to turn written symbols into the sounds of language, is highly incomplete on the subject of reading comprehension—the skill that is mainly measured in later grades and the ability that our older students chiefly lack. Important scientific studies of comprehension showing the paramount importance of relevant knowledge are not to be found in the text or bibliographies of the NRP report.

Fatefully, the National Reading Panel did not include enough top specialists in language comprehension. The panel urgently needs to be reconvened to repair that omission so a revised report can be issued explaining that if we want students to score well on reading tests in the eighth grade and not just in the fourth grade, we need to teach them the broad knowledge that is taken for granted in books and lectures. A revised and improved NRP report would also emphasize that a knowledge-based strategy must be long-range—starting as early as kindergarten to focus on substantial content read aloud to students and discussed.

Language comprehension is a slow-growing plant. Even with a coherent curriculum, the buildup of knowledge and vocabulary is a gradual, multiyear process that occurs at an almost imperceptible rate. The results show up later.

Consider the eighth-grade NAEP results from Massachusetts, which are a stunning exception to the nationwide pattern of stagnation and decline. Since 1998, the state has improved significantly in the number of eighth-graders reading at the "proficient" or "advanced" levels: Massachusetts now has the largest percentage of students reading at that higher level, and it is No. 1 in average scores for the eighth grade. That is because Massachusetts decided in 1997 that students (and teachers) should learn certain explicit, substantive things about history, science and literature, and that students should be tested on such knowledge.

The sure road to adequate progress in reading is adequate progress in knowledge. Congress and the states should note that the best tests to "teach to" are subject-matter tests based on explicit content standards for each grade. Massachusetts's results confirm that this is the best way to measure and to achieve real progress in reading. The revisers of No Child Left Behind, and all who are connected with our schools, need to be cognizant of—and do something about—the critical knowledge connection.

—E.D. Hirsch Jr. is an author, most recently of "The Knowledge Deficit," and chairman of the Core Knowledge Foundation.

Many Americans Can Read But Can't Comprehend

E.D. Hirsch Jr., *USA Today*

Back in the 1970s, I had a "Eureka!" moment as I reviewed the results of reading comprehension tests. The community college students we tested had done almost as well as students at the highly selective University of Virginia—as long as the passages the community college students were asked to read dealt with familiar, everyday topics. But when they encountered passages that required historical background, they faltered. These Richmond, Va., students had difficulty understanding a passage on Ulysses S. Grant and Robert E. Lee because many of them were unfamiliar with the Civil War. That shocked me.

These students had been cheated. They hadn't acquired important general knowledge in their homes and communities, and their schools hadn't compensated for that. Their basic intelligence was sound. They simply did not have the knowledge they needed to make sense of many texts.

Since then, I have argued for a deeper understanding of reading. Successful reading requires more than an ability to decode, or "sound out," words. It also requires adequate background knowledge, or "cultural literacy." Without background knowledge of history, literature, art, music, science and math, students will read—but without comprehension.

Gap widens

For years, reading scores have remained low. The achievement gap between advantaged and disadvantaged children is not only dishearteningly wide, but also grows bigger the longer students stay in school. These dismal facts help explain the bipartisan agreement Congress mustered to pass the No Child Left Behind Act, with its provision that federal grants be contingent on all children making "adequate yearly progress" in reading.

That provision sent shock waves through schools and prompted more complaints about standardized tests—misplaced complaints, because standardized reading tests are valid and reliable. They measure the real-world ability to read, and they reliably predict the ability to become good learners, earners and citizens. The tests aren't the problem; it's the scores our children are making on them.

As a consequence of that law, some localities have mandated that schools devote large chunks of time to reading in early grades. In California, for example, it's 150 minutes per

day. You'd think such an intensity of effort would yield proportionately big results; yet, test scores have risen only modestly or not all, and the reading gap between groups remains large.

Why? Recall those community college students. They had mastered decoding skills. They may have been taught to read by phonics techniques, which are now regarded by most educators as the most effective way to teach reading. But they hadn't been exposed coherently to important knowledge, such as the history of the Civil War. They hadn't developed the broad vocabulary that comes with general knowledge.

Time vs. knowledge

Their deficiencies underscore what is missing in the way we teach reading: We expand the time spent on reading but don't examine what is being read. Most of the precious hours spent on reading should be devoted to history, science, literature and art, not bland stories about "José at the supermarket," or "Janice and her new friend." Content-rich reading selections should be part of an integrated curriculum that builds up the broad knowledge and varied vocabulary required for true reading comprehension.

"Some people may ask why first-graders need to know Hammurabi's Code or Queen Hatshepsut, or why fifth-graders should read Don Quixote ," wrote Kathy Schaub, a Catholic school principal in San Antonio. "Why not? I have never seen so much enthusiasm for learning."

History and literature, interesting and exciting in their own rights, also will be useful to these students when, for instance, they come across a description of someone "tilting at windmills." Because these students possess not just decoding skills, but also wide knowledge and cultural literacy, they more likely will be strong readers and full participants in our democratic society.

—E.D. Hirsch Jr., the author of Cultural Literacy and
The Schools We Need and Why We Don't Have Them,
founded the Core Knowledge Foundation, whose curriculum is used in more than 600 U.S. schools.

Editorial/Opinion USA Today, 2008

Curriculum for Democracy

A content-rich pedagogy makes better citizens and smarter kids.

E.D. Hirsch/Sol Stern, *City Journal*

Coliseum: Carlos Gotay/Getty Images; Sistine Chapel ceiling: Vatican Museums and Galleries, Vatican City, Italy/The Bridgeman Art Library; Lincoln: the Bridgeman Art Library; Shakespeare: Ken Welsh/The Bridgeman Art Library

At his Senate confirmation hearing in February, Arne Duncan succinctly summarized the Obama administration's approach to education reform: "We must build upon what works. We must stop doing what doesn't work." Since becoming education secretary, Duncan has launched a $4.3 billion federal "Race to the Top" initiative that encourages states to experiment with various accountability reforms. Yet he has ignored one state reform that has proven to work, as well as the education thinker whose ideas inspired it. The state is Massachusetts, and the education thinker is E. D. Hirsch, Jr.

The "Massachusetts miracle," in which Bay State students' soaring test scores broke records, was the direct consequence of the state legislature's passage of the 1993 Education Reform Act, which established knowledge-based standards for all grades and a rigorous testing system linked to the new standards. And those standards, Massachusetts reformers have acknowledged, are Hirsch's legacy. If the Obama administration truly wants to have a positive impact on American education, it should embrace Hirsch's ideas and urge other states to do the same.

Hirsch draws his insights from well outside traditional education scholarship. He started out studying chemistry at Cornell University but, mesmerized by Nabokov's lectures on Russian literature, switched his major to English. Hirsch did his graduate studies at Yale, one of the citadels in the 1950s of the New Criticism, which argued that the intent of an author, the reader's subjective response, and the text's historical background were largely irrelevant to a critical analysis of the text itself. But by the time Hirsch wrote his doctoral

dissertation—on Wordsworth—he was already breaking with the New Critics. "I came to see that the text alone is not enough," Hirsch said to me recently at his Charlottesville, Virginia, home. "The unspoken—that is, relevant background knowledge—is absolutely crucial in reading a text." Hirsch's big work of literary theory in his early academic career, *Validity in Interpretation*, reflected this shift in thinking. After publishing several more well-received scholarly books and articles, he received an endowed professorship and became chairman of the English department at the University of Virginia.

Hirsch was at the pinnacle of the academic world, in his mid-fifties, when he was struck by an insight into how reading is taught that, he says, "changed my life." He was "feeling guilty" about the department's inadequate freshman writing course, he recalls. Though UVA's admissions standards were as competitive as the Ivies', the reading and writing skills of many incoming students were poor, sure to handicap them in their future academic work. In trying to figure out how to close this "literacy gap," Hirsch conducted an experiment on reading comprehension, using two groups of college students. Members of the first group possessed broad background knowledge in subjects like history, geography, civics, the arts, and basic science; members of the second, often from disadvantaged homes, lacked such knowledge. The knowledgeable students, it turned out, could far more easily comprehend and analyze difficult college-level texts (both fiction and nonfiction) than their poorly informed brethren could. Hirsch had discovered "a way to measure the variations in reading skill attributable to variations in the relevant background knowledge of audiences."

This finding, first published in a psychology journal, was consistent with Hirsch's past scholarship, in which he had argued that the author takes for granted that his readers have crucial background knowledge. Hirsch was also convinced that the problem of inadequate background knowledge began in the early grades. Elementary school teachers thus had to be more explicit about imparting such knowledge to students—indeed, this was even more important than teaching the "skills" of reading and writing, Hirsch believed. Hirsch's insight contravened the conventional wisdom in the nation's education schools: that teaching facts was unimportant, and that students instead should learn "how to" skills.

Hirsch gave a lecture on the implications of his study at a Modern Language Association conference and then expanded the argument in a 1983 article, titled "Cultural Literacy," in *The American Scholar*. The article caused a stir, not so much in the academy (and certainly not in the ed schools) as among public intellectuals. William Bennett, then chair of the National Endowment for the Humanities, encouraged Hirsch to pursue his theme. Education historian Diane Ravitch urged him to get a book out fast and to call it *Cultural Literacy* as well.

Hirsch heeded the advice, and in 1987, the book landed on the *New York Times*'s bestseller list, where it stayed for 26 weeks, resulting in a dramatic career change for the author. He kept researching and writing about how to improve the "cultural literacy" of

young Americans and launched the Core Knowledge Foundation, which sought to create a knowledge-based curriculum for the nation's elementary schools. A wide range of scholars assisted him in specifying the knowledge that children in grades K–8 needed to become proficient readers. For example, the Core Knowledge curriculum specifies that in English language arts, all second-graders read poems by Robert Louis Stevenson, Emily Dickinson, and Gwendolyn Brooks, as well as stories by Rudyard Kipling, E. B. White, and Hans Christian Andersen. In history and geography, the children study the world's great rivers, ancient Rome, and the Constitution and the Declaration of Independence, among other subjects.

By the late 1980s, Hirsch had all but abandoned academic literary studies and become a full-time education reformer. His curriculum appeared at an opportune moment. Four years earlier, the U.S. government had released *A Nation at Risk*, a widely publicized report about falling SAT scores and the mediocre education that most American kids were getting. The report set off shock waves among parents, many of whom weren't thrilled, either, when they heard educators dismissing the report's implications. Parents saw Hirsch's call for a coherent grade-by-grade curriculum as an answer.

I was one of those parents. My children were students at P.S. 87 on Manhattan's Upper West Side, also known as the William Tecumseh Sherman School. Our school enjoyed a reputation as one of the city's education jewels, and parents clamored to get their kids in. But most of the teachers and principals had trained at Columbia University's Teachers College, a bastion of so-called progressive education, and militantly defended the progressive-ed doctrine that facts were pedagogically unimportant. I once asked my younger son and some of his classmates, all top fifth-grade students, whether they knew anything about the historical figure after whom their school was named. Not only were they clueless about the military leader who delivered the final blow that brought down America's slave empire; they hardly knew anything about the Civil War, either. When I complained to the school's principal, he reassured me: "Our kids don't need to learn about the Civil War. What they are learning at P.S. 87 is *how* to learn about the Civil War."

Were it not for Hirsch's *Cultural Literacy*, I might have accepted the reassurance. But Hirsch, as it happened, had cited an experiment that found that college students unable to comprehend a difficult passage about the Civil War by historian Bruce Catton were also likely not to have learned anything about the Civil War in the early grades. From that point on, my wife and I accelerated our children's supplementary home schooling and sometimes used the Core Knowledge Foundation's guide to the "mere facts" that children should know in each grade.

Like *A Nation at Risk*, *Cultural Literacy* came under fierce attack by education progressives, partly for its theory of reading comprehension but even more for its supposedly elitist

presumption that a white male college professor should decide what American children learn. Critics derided Hirsch's lists of names, events, and dates as arbitrary, even racist. The progressives often lumped him in with the three "killer Bs"—Bennett, (Allan) Bloom, and (Saul) Bellow—whom they loved to hate at the height of the 1980s culture wars. Because Bloom's *The Closing of the American Mind* appeared just above *Cultural Literacy* on the bestseller lists for most of 1987, many liberal commentators paired the two writers, calling them conservatives agitating for a return to a more traditional, elitist education.

In fact, Hirsch is and always has been a liberal Democrat. Far from being elitist, he insists, cultural literacy is the path to educational equality and full citizenship for the nation's minority groups. "Cultural literacy constitutes the only sure avenue of opportunity for disadvantaged children," Hirsch writes, and "the only reliable way of combating the social determinism that now condemns them to remain in the same social and educational condition as their parents. That children from poor and illiterate homes tend to remain poor and illiterate is an unacceptable failure of our schools, one which has occurred not because our teachers are inept but chiefly because they are compelled to teach a fragmented curriculum based on faulty educational theories."

Hirsch's next book, *The Schools We Need and Why We Don't Have Them* (1999), took the argument about core knowledge and educational equity to the next level by dismantling those faulty theories. Hirsch's early academic work on Wordsworth and the Romantics helped him in this project, since he could see how the progressives' education agenda was rooted in a deeply flawed understanding of child development that went back to Rousseau. "The Romantics were wonderful for poetry but wrong about life," Hirsch tells me, "and they were particularly wrong about education." European Romanticism, he argued in the book, "has been a post-Enlightenment aberration, a mistake we need to correct."

Influenced by the Romantics, progressive-education doctrine held that children learn best "naturally" and that we should not drill "lifeless" facts into their developing minds. Such views, which became prevalent in American teacher training by the 1920s, Hirsch shows, represented a sharp break with the Founding Fathers, who believed that children needed to learn a coherent, shared body of knowledge for the new democracy to work. Thomas Jefferson even proposed a common curriculum, so that children's "memories may here be stored with the most useful facts from Grecian, Roman, European, and American history."

By the time Hirsch turned his attention to education reform in the mid-1980s, Romanticism's triumph was complete. Most public schools, for instance, taught reading through the "whole language" method, which encourages children to guess the meaning of words through context clues rather than to master the English phonetic code. In many schools, a teacher could no longer line up children's desks in rows facing him; indeed, he found himself banished entirely from the front of the classroom, becoming a "guide on the side" instead

of a "sage on the stage." In my children's elementary school, students in the early grades had no desks at all but instead sat in circles on a rug, hoping to re-create the "natural" environment that education progressives believed would facilitate learning. In the 1970s and 1980s, progressive education also absorbed the trendy new doctrines of multiculturalism, post-modernism (with its dogma that objective facts don't exist), and social-justice teaching.

More powerfully than any previous critic, Hirsch showed how destructive these instructional approaches were. The idea that schools could starve children of factual knowledge, yet somehow encourage them to be "critical thinkers" and teach them to "learn how to learn," defied common sense. But Hirsch also summoned irrefutable evidence from the hard sciences to eviscerate progressive-ed doctrines. Hirsch had spent the better part of the decade since *Cultural Literacy* mastering the findings of neurobiology, cognitive psychology, and psycholinguistics on which teaching methods best promote student learning. The scientific consensus showed that schools could not raise student achievement by letting students construct their own knowledge. The pedagogy that mainstream scientific research supported, Hirsch showed, was direct instruction by knowledgeable teachers who knew how to transmit their knowledge to students—the very opposite of what the progressives promoted.

The ed-school establishment has worked busily to discredit Hirsch. In 1997, the journal of the American Educational Research Association (AERA), the umbrella organization representing most education professors and researchers, launched an unprecedented 6,000-word dismissal of his work. Hirsch recounts, too, how he finally got the nod to teach one course on the black-white achievement gap—a hot topic—in Virginia's education department, though not until he had won all of his university's academic honors, written one best-selling book on education, and written another listed by the *New York Times* as a notable book of the year. But whereas his courses in the English department always overflowed with students, his education course drew only a handful for three straight years. Finally, one of the students broke the news: the education faculty had repeatedly warned them not to take the course.

Hirsch shrugs off these slights and keeps working. At 81, he has written what may be his most important book, *The Making of Americans: Democracy and Our Schools*, which deepens his argument about the American Founders' support for core knowledge.

Hirsch recounts the famous story of Benjamin Franklin leaving the Constitutional Convention and being asked by a lady, "Well, Doctor, what have we got?" Franklin's memorable answer: "A Republic, madam, if you can keep it." Inculcating young Americans in the new democratic civic religion, the Founders believed, was the best way to "keep the Republic" and preserve it from "factions," voters who cared only about their own groups' narrow interests. Schools needed to help create virtuous, civic-minded, and knowledgeable citizens—and the best way for them to do that was to teach the same grade-by-grade

curriculum to each child. "The school would be the institution that would transform future citizens into loyal Americans," Hirsch writes. "It would teach common knowledge, virtues, ideals, language, and commitments."

Hirsch's description of the Founders' educational views is both reverential and elegiac. Most American leaders, well into the nineteenth century, believed passionately that schools' main task was "the making of Americans," Hirsch writes. He refers here not only to the millions of European immigrants arriving throughout the nineteenth century but also to native-born Americans from different regions and religions, who needed common schools as the means of acculturation into the "common language community" of a still-new country.

Lincoln's famous Lyceum speech of 1838, Hirsch notes, was primarily about common schooling and shared knowledge as democratic touchstones. In the speech, Lincoln assigned schools the task of teaching the American credo of "solidarity, freedom, and civic peace above all other principles." Let these principles, Lincoln said, "be taught in schools, in seminaries, and in colleges—let it be written in Primmers [sic], spelling books and almanacs." These beliefs were already reaching young Americans through Noah Webster's grammars and dictionaries and William McGuffey's readers.

After Hirsch has memorialized early American education, you can almost hear his remorse as he surveys what passes for higher thinking today in the education schools and teachers' organizations. In *The Making of Americans*, Hirsch again shows how consensus science proves that "a higher-order academic skill such as reading comprehension requires prior knowledge of domain-specific content." But the ed schools' closed "thoughtworld" (Hirsch's term) has insulated itself from science. For that matter, future classroom teachers must search far in ed-school syllabi to find a single reference to any of Hirsch's work—yet required readings by radical education thinkers such as Paulo Freire, Jonathan Kozol, and ex-Weatherman Bill Ayers are common. From these texts, prospective teachers will learn that the purpose of schooling in America isn't to create knowledgeable, civic-minded citizens, loyal to the nation's democratic institutions, as Jefferson dreamed, but rather to undermine those institutions and turn children into champions of "social justice" as defined by today's America-hating far Left.

Hirsch's theories, long merely persuasive, now have solid empirical backing in Massachusetts's miraculous educational reforms. Before the state passed its reform legislation, school districts employed a hodgepodge of instructional approaches, had no standard curriculum, and neglected academic content. But one element of the 1993 Education Reform Act was Hirschean knowledge-based curricula for each grade. The history and social-science curriculum, for instance, makes clear that students should be taught explicitly about their rich heritage, rather than taught how to learn about that heritage. The curriculum calls for schools to "impart to their students the learning necessary for an informed, reasoned

allegiance to the ideals of a free society." This learning includes "the vision of a common life in liberty, justice, and equality as expressed in the Declaration of Independence and the Constitution two centuries ago." Why is this essential? "We are convinced that democracy's survival depends upon our transmitting to each new generation the political vision of liberty and equality that unites us as Americans. It also depends on a deep loyalty to the political institutions our founders put together to fulfill that vision."

In the new millennium, Massachusetts students have surged upward on the biennial National Assessment of Educational Progress (NAEP)—"the nation's report card," as education scholars call it. On the 2005 NAEP tests, Massachusetts ranked first in the nation in fourth- and eighth-grade reading and fourth- and eighth-grade math. It then repeated the feat in 2007. No state had ever scored first in both grades and both subjects in a single year—let alone for two consecutive test cycles. On another reliable test, the Trends in International Math and Science Studies, the state's fourth-graders last year ranked second globally in science and third in math, while the eighth-graders tied for first in science and placed sixth in math. (States can volunteer, as Massachusetts did, to have their students compared with national averages.) The United States as a whole finished tenth.

In fact, in the quarter-century since *A Nation at Risk* and the first edition of *Cultural Literacy*, the academic performance of American students has continued to lag behind most of the developed world. SAT scores are up slightly in math but remain flat in reading. With the notable exception of Massachusetts, NAEP reading scores are also flat in most states. According to the ACT administrators, under one-quarter of high school graduates taking the 2009 test were "college ready."

It is hard to imagine that our students, particularly in grades 3–8, wouldn't have done much better if the schools had adopted the Hirsch solution of a content-rich, grade-by-grade curriculum and recognized that the way for students to achieve advanced reading comprehension is to master a broad range of background knowledge. By now, it should be evident that teaching children in the early grades "*how* to learn about the Civil War" will not necessarily lead them ever to learn about the Civil War—or about any of the other pivotal events in their country's history.

The most hopeful alternative to dead-end progressive education is still to be found in Charlottesville. The national headquarters of the Core Knowledge Foundation is located a block or two from the University of Virginia in a sprawling, two-story residential house with a wraparound porch. A staff of about 25 people is working on a new K–3 reading program and bringing the Core Knowledge K–8 curriculum up to date with the latest relevant subject matter. The staff also maintains contact with a network of about 1,000 Core Knowledge schools around the country (many of them charters).

Some Core Knowledge supporters have urged Hirsch to move the foundation 100 miles northeast, to the nation's capital. After all, Washington is the main battleground of school reform, where all the other big-time education organizations—the two national teachers' unions, the professional teachers' organizations, the AERA, the education think tanks—are located, so that they can lobby Congress and sell their wares to federal education officials. But Hirsch is an American original and an incurable optimist. Not only does he trust that if you build a better mousetrap, the world will come to your door; he thinks that it's appropriate that his foundation should remain near the college that was Jefferson's greatest education creation.

Perhaps the time isn't too far off when Hirsch's optimism will be vindicated. There's a tantalizing hint of that possibility on the dust jacket of *The Making of Americans*. Original Core Knowledge supporter Diane Ravitch offers praise for the book, but two of the other blurbers are more surprising: Randi Weingarten, the newly installed president of the million-member American Federation of Teachers, and Joel Klein, chancellor of the nation's largest school district. Usually, you hear those two names spoken in the same breath only when they're in contention. Last month, moreover, Klein unfurled the results of a study that compared ten city schools using the Core Knowledge reading program with schools using other curricula. The Core Knowledge kids achieved progress at a rate that was "more than five times greater," Klein said, heaping praise on the program.

The problem is that Core Knowledge programs are still in only a handful of schools in New York City, while how-to programs straight out of Teachers College are in about 700. Let Klein and Weingarten jointly decide that this ratio should be reversed, and it will be the beginning of a new era in school reform. It will also be a fitting testament to America's most important education reformer of the last century.

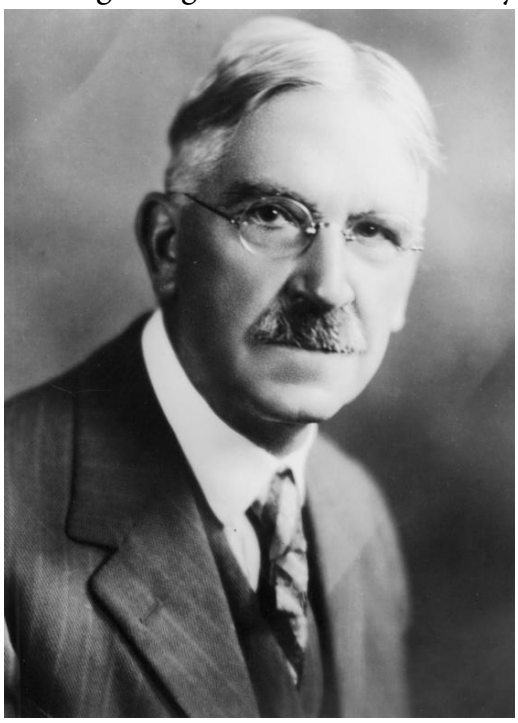
—*Sol Stern is a contributing editor of* City Journal, *a senior fellow at the Manhattan Institute, and the author of* Breaking Free: Public School Lessons and the Imperative of School Choice.

High Priests of Miseducation

Bob Schaffer, Headmaster

As has been mentioned much, the entire k-12 faculty has read **E.D. Hirsch's** "farewell" book entitled *How to Educate A Citizen: The Power of Shared Knowledge to Unify a Nation.* We revisit its passages throughout the school year for ongoing professional-development sessions.

I urge parents to read the concise, and accessible work, too. We have copies in the Constance Behr Memorial Library. Hirsch explains much of the philosophy undergirding our school's classically oriented, knowledge-intensive curriculum; and, in doing so, does a thorough job explaining the country's educational decline.



Hirsch identifies philosopher **John Dewey** as a chief culprit whose entrancing theories managed to supplant America's classical-education traditions with educational Romanticism of a particular German lineage. Indeed, Dewey's *My Pedagogic Creed* ordains the classroom teacher as "a social servant set apart for the maintenance of proper social order and securing the right social growth."

Further on, Dewey declares "in this way the teacher always is the prophet of the true God and the usherer in of the true Kingdom of God." Appreciated in its intended context, this delusional pretext has become somewhat the credo of American public-school pedagogy and among the sundry misguided ideas our school exists, in part, to defy – for its effect, in practice, is to lead children away from traditions of family, the Church, the Synagogue, and other essential American institutions.

Liberty Common School's insistence upon classical approaches to the acquisition of knowledge is intended as "the great equalizer" among young citizens. Truth, beauty, goodness, and perfection – the bare takeaways of properly taught curriculum – stand on their own and thereby become the self-evident guideposts by which our students graduate equipped to navigate courageous lives of self-reliance, rugged individualism, enduring independence, true freedom, and authentic liberty.

Liberty's Thinking Framework

A Classical Framework for Teaching Thinking

Dr. Randy Everett, Founder

Classical education has, since ancient times, included an implicit and explicit understanding of the development of thinking. In most treatments of the progression of how to teach thinking, four natural steps are identified. A recognition of these four steps, and their application to different age groups, is vital in answering questions of educational policy for both the content and instructional approach of schooling at each grade.

In an ancient Egyptian text written possibly 4 millennia ago and later captured on the Shabako Stone, the steps of thinking are 1) *Reception*—the proper use of the senses to acquire knowledge about the world around us. 2) *Perception*—the accurate processing of such input by mind and heart to understand the inherent patterns or relationships within the knowledge. 3) *Formation* — the organizing of one's perceptions into language and hence thoughts, or plans, and 4) *Action* —taken to bring life to those thoughts, or test those plans.

Just two centuries ago the famous German poet, **Johann Wolfgang von Goethe,** put forth his formula for how creativity is developed. He identified four steps in his drama "Faust," which parallel the Egyptian formula, namely: First there is the word, or knowledge; Second, the meaning or pattern; Third, the power or what we would call mental discipline or mental modeling; Finally, the act which is either problem-solving or creativity such as composition, etc.

In our day, **Robert Mitchell,** the Underground Grammarian, has summarized these same steps in the following lines: "Knowledge consists of the facts, the relations between

them, the thinking about them; and, the effort to understand and connect them. It is not out of ignorance that we discover understanding. It is because of what we already know that we can know more, that we can discern organizing principles, and make and test hypotheses, and act rationally." These lines tersely reiterate our ancient, proven framework for teaching thinking.

First identified is knowledge; and herein lies just one of the great values of teaching a solid core of background knowledge as put forward in Liberty's K-8 Core Knowledge Sequence. As **John Holdren** of the Core Knowledge Foundation has stated, "Without a lot of pertinent factual knowledge about an issue or problem, you can't think critically about it—you can only have an uninformed opinion… If we're concerned about having students think 'critically,' then we have an obligation to give them the knowledge that will make them *informed* thinkers, not mere likers and dislikers. That's why, from the early years, we should teach them a lot of factual knowledge. We should, of course, also provide frequent opportunities to discuss the facts, to analyze apparent contradictions, to challenge accepted interpretations… Maybe then we'll produce at least some students who develop the habit of choosing words carefully, of avoiding clichés, and resisting unquestioned orthodoxies—such as the uncritical use of a term like 'critical thinking.'

No one, except perhaps Joe Friday, wants 'just the facts,' at least not in schools. We also want—and our students need—opportunities to use the facts, to apply them, question them, discuss them, doubt them, connect them, analyze them, verify or deny them, think critically about them. All these higher-order activities, however, rely upon having some facts to work with. Without knowing a lot of facts, you lack the solid foundation upon which to build all higher order skills. And that's a fact."

The four steps of the **Thinking Framework** constitute a fractal, or a nested pattern. What is meant by that is that the progression of learning to think occurs in a large slowly developing way over our entire K-12 education, and it happens during each year or with each individual lesson along the way. Regardless of our age, each time we learn enough about a thing to think productively about it, we go through these steps. But also, the natural development of our brains results in our learning most effectively about the world around from age one to about age 18 along the same four steps. We begin childhood as a sponge

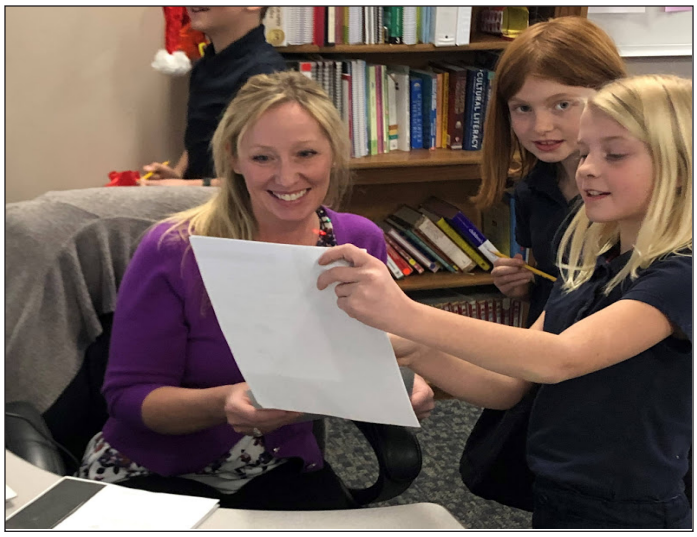
soaking up knowledge from intensely curious observation and later informal and formal instruction. Though all of the steps are always occurring, the first eight or so years of life are principally associated with the acquisition of facts and knowledge. Age 9-12 is roughly the period when the mind occupies itself with figuring out how some things it knows are related to other things it knows. During the years from approximately 13 to 16 the mind spends much of its time (assuming it has learned enough) playing around with what it knows wondering if some ideas project reasonably into different circumstances. Finally, given an adequate education, the mind is prepared to solve problems and otherwise act creatively.

Looking at the scope and sequence of the curriculum and coursework at Liberty one can recognize that the entire design of academic program is put together to make the most of the naturally existing Thinking Framework. To Wit:

Knowledge: In Liberty's beginning grades (K–3), the acquisition of common knowledge —about a wide variety of subjects—is the primary focus of our school's Thinking Framework.

Patterns: While students naturally make inferences on their own about the relations of the facts and ideas, Liberty instructors skillfully help students make connections and see the patterns—dissimilitude in similitude, and similitude in dissimilitude. This emphasis occurs at the next level, generally grades 4–6. During these grades Liberty teachers, in addition to teaching more knowledge, specifically look for ways to train students' perceptions of organizing principles, the relations between things they have learned or observed.

Modeling: During the years of grades 7–9, Liberty's students continue to learn many new facts and their relationships, but more and more of this is independent. Because of how knowledge builds upon knowledge, schemes are quicker to form and be modeled. In junior high, mental modeling—the making and testing of arguments and hypotheses (including logic)—is explicitly and implicitly taught, and students are given ample opportunity to practice. In writing, this means essays that marshal several concepts with underlying evidence. In history, it means an effort to link the patterns of individual human nature with social influence to project explanations of future or past causation. In math, this means symbolic representation of complex problems, algebra and geometry.



American psychologist **Jerome Bruner** was referring to this third level

(mental modeling when he said, "In contrast to analytic thinking, intuitive thinking characteristically does not advance in careful, well-defined steps. It tends to involve maneuvers based seemingly on an implicit perception of the total problem. Unfortunately, the formulation of school learning has somehow devalued intuition." Using the Thinking Framework one could conclude that intuition became devalued when the steps that lead to it (the acquisition of knowledge and its structure were removed from the curriculum.

Theodore Sizer also refers to mental modeling when he says, "A science course, built on sheer memory work, that never gives examples of or experience in scientific inquiry would be as stunted as a course that engages in some sort of disembodied, abstract problem-solving that demands of the students no command of precise knowledge." Fortunately, in science education, Liberty embraces the more direct effort to follow the natural steps of the Thinking Framework.

Creativity: The final step of learning to think is seen in action in our High School and involves leading students to action, or problem solving including judgment and creativity. This is the stage at which Liberty instructors acclimate our students for the accelerating pace of our classical, college-preparatory high-school curriculum. This final, creative stage of higher-order thinking cannot proceed apace if the other three have not preceded.

Liberty's Thinking-Framework sequence may seem obvious for its common sense. Indeed, most American high-school instructors certainly wish the majority of their students were prepared for elevated problem-solving work. In 2010, Liberty Common launched its classical, college-preparatory high school to further assist Liberty families wanting to capitalize on all of their child's academic advantages acquired through a Core-Knowledge elementary, and junior-high/middle school program.

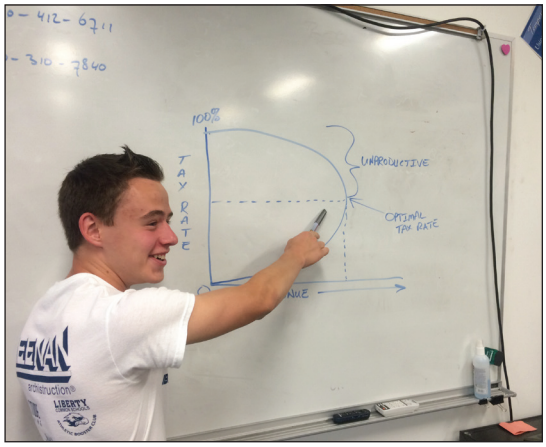
Our classical, college preparatory high school program is sometimes characterized as a less-is-more approach, meaning a fewer number of examples are tackled, but each is studied more deeply and broadly. This can only work in a disciplined academic setting that coordinates multiple years in the classroom where knowledge has been expertly stacked upon knowledge. The coursework articulated at Liberty Common High School takes into account, and assumes to the greatest extent possible, the common background held by our students-the perception of patterns, and relationships that can only come by wide exposure to a canon of factual knowledge purposefully acquired through a learned schema, and applied to novel situations.

In this way, Liberty Common School endeavors to prepare its students for writing, trigonometry, calculus, history, economics, literature, and art—in each case, taught with a high and specific expectation of productivity. As **Peter Emberley** said, "This is an education which is without ostentation, and education which through the gradual and sequential formation of habits and talents produces a critical and impartial mind."

The Clean Air of Liberty

Bob Schaffer, Headmaster

Starting in kindergarten, Liberty students learn important economic lessons involving tradeoffs—wants versus needs, property rights and elementary principles of voluntary trade. By the time they graduate, our students enjoy quite an impressive and refined understanding of economics.



It is a very important academic discipline, one that gets only summary treatment in most American schools. If fact, most college graduates today have never been exposed to a legitimate course in economics.

This is an unfortunate reality that enables too many tragic personal decisions, and political ones when considering the widespread economic illiteracy among the American electorate. As an academic discipline, economics informs vital subjects such as engineering, business, philosophy, political science, and all the other social sciences.

The depth of Liberty's economics program is yet another example of what makes our school so unique. As parents, applying our students' economics lessons to the school itself will prove crucial in charting the institution's success over the next decade and beyond.

For example, our school is directly threatened by the rapidly intensifying trends of federal and state lawmakers to meddle more deeply in the management and the very craft of public education. With every new top-down "reform," America's public schools get worse.

Liberty must remain vigilant in the face of these troubling national trends, and we must be prepared to rise above them. It is imperative we do everything possible to preserve traditional American concepts of parental control, school choice, and marketplace education.

Historically regarded as a local responsibility in America, public education is now more dominated by the whim and fancy of politicians than ever before. This is a hazardous reality for our students.

One of the economic philosophers studied by our ninth-grade economics students is **Claude Frédéric Bastiat.** Writing amid the 1848 Revolution in France, Bastiat characterized the proclivity of French politicians to pass more laws as an arrogant attempt to force French people to become more equal.

On the contrary, Liberty adheres to the Core Knowledge Sequence which views a rigorous education itself—not the law—as the great equalizer. This philosophy is ingrained in the school's mission statement and in all we do.

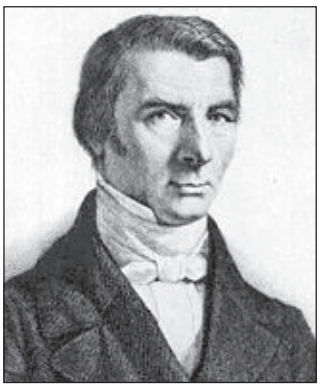
So is the concept of parental control. Liberty rejects the idea that a school is a place a parent can simply send her or his child to become educated by others.

We firmly believe it is the exclusive responsibility of parents—indeed a moral obligation—and their natural right to direct the education and upbringing of their children. As conscientious parents, we commonly hire instructors who teach in schools to assist us in best accomplishing this solemn duty.

We the parents choose them. Not the other way around.

Parents have authority to make the best academic choices for their own child. At Liberty, parents actually oversee the school and ensure the institution maintains strict fidelity to its mission statement, its organizational objectives, and its charter.

Sending our kids off to government-owned buildings and expecting them to somehow return home smarter has never worked. It can't work. It doesn't work.


Claude Frédéric Bastiat

Yet, many people somehow expect it would. Topping that list are politicians.

Of them, Bastiat wrote, "There are too many 'great' men in the world—legislators, organizers, do-gooders, leaders of people, fathers of nations, and so on, and so on. Too many persons place themselves above mankind; they make a career of organizing it, patronizing it, and ruling it."

Our economics students know very well the interplay of these economic principles in such an equation. Self-interest (as opposed to selfishness), free markets, capital efficiency, sound money, and less bureaucracy help humans to, in Bastiat's words, "develop themselves harmoniously in the clean air of liberty."

He wrote, "Away with the whims of governmental administrators, their socialized projects, their centralization, their tariffs, their government schools, their state religions, their free credit, their bank monopolies, their regulations, their restrictions, their equalization by taxation, and their pious moralizations!"

Bastiat finished his most famous work *The Law* this way, "And now that the legislators and do-gooders have so futilely inflicted so many systems upon society, may they finally end where they should have begun: May they reject all systems, and try liberty; for liberty is an acknowledgment of faith in God and His works."

Bastiat's mantic words sprung from the French upheaval of his day. Liberty scholars read *The Law* now to better understand the economic principles of theirs.

As Liberty parents, we are similarly obligated to understand how contemporary political impulses and economic conditions overawe the future success of our children. It is our duty—actually our moral privilege—to help Liberty's young scholars "develop themselves harmoniously in the clean air of liberty."

Classical Liberalism

Bob Schaffer, Headmaster

Liberty Common School's classical curriculum consistently delivers high-level conversation about timeless principles. These discussions, it is hoped, will one day stir our graduates to action.

This is one reason LCS has become a truly important institution. Indeed, timeless principles, when set in motion, actually expand the frontiers of liberty.

Regardless of how much one thinks about it, all people actually care quite a lot about timeless principles. We care about consistency, predictability and transparency in our leaders, in our personal relationships and business partnerships. The sooner one grasps these important concepts, the better a leader one is likely to become.

Liberty's classical-liberal approach is predicated upon acknowledgment and deference to natural law — the understanding that human nature relates directly to a larger natural order. As such, natural law effects how man behaves, determines what humans need, and ultimately helps predict how the majority are likely to react under certain circumstances.

The American Founders actually predicated the entire Declaration of Independence upon this concept. They wrote of the necessity for people to assume the "Station to which the Laws of Nature and of Nature's God entitle them."

For generations, this seminal concept of man had been parsed by history's most significant philosophers. Chief among them were Montesquieu, St. Thomas Aquinas, and John Locke—who had profound influence on the Founders.

As Liberty educates future leaders, we want them to understand human nature and natural law. For example, in economic leadership, our students should be able to explain why free people are motivated to create jobs.

As business leaders, they should respect the ability of free people to make the wisest and most-logical decisions about their wealth. As leaders for peace, they should understand the essence of liberty and know why rational beings are compelled to defend it when threatened.

As active citizens and voters, we often speculate on how early political leaders acquired stature in civic leadership and how quickly they embraced the basic elements of natural law. Did they always adhere to these principles? Did they ever discard them; and, if so, why?

Sure, leaders can change. Yes, they evolve and mature. They can improve. They can be brought to see things differently. These are not bad qualities.

Nonetheless, the value of consistency escalates according to the importance of the station being sought. We've all been disappointed by leaders who were driven by expedience, or whose beliefs turn out to be a show of cognitive dissonance rather than internalized virtue.

Changing one's philosophy is okay for perhaps a student. However, over the long term, Liberty strives toward consistency—not just for consistency's sake, but because we are genuinely driven by timeless principles anchored in natural law. Indeed, Liberty's philosophy embraces the same classical-liberal ideas that mark civilization's best philosophers.

They are the same principles that moved America's Founding Fathers to action, and which continue to expand the frontiers of liberty. They are the qualities we seek most in our leaders today and in the future.

Timeless principles are, in fact, virtues and ambitions that guide LCS, that unite us as the Liberty family, and move our students boldly together in every classroom in which they gather.

All Liberty Students are Gifted

Casey Churchill, Principal LCS

Every now and then I receive questions from parents about our gifted and talented program. Unlike other local schools, Liberty does not have a traditional gifted and talented program.

Liberty Common School believes that all students demonstrating the capacity to acquire knowledge at the accelerated pacing of the LCS curriculum, scope, and sequence are in possession of exceptional intellectual gifts. Accordingly, LCS recognizes each successful student enrolled in the institution as being both gifted, and with exceptional academic talents.

In accordance with Section 301-8 of the Code of Colorado Regulations, and the 2016 Rules for the Exceptional Children's Educational Act (ECEA), Liberty Common School (LCS) employs its **Policy for Students Under ECEA 12.00** in order to identify and properly serve its students. Because of Liberty's rigorous curriculum, few students receive such services.

Our school sets rigorous academic standards and students and staff work hard to achieve them. With a school philosophy based around the premise that it is the right and responsibility of the parents to direct the education and upbringing of their children, we feel that challenging students to their top potential does not rest solely on the school. We play a part but so do the parents.

Some schools like to boast their gifted and talented program. They sport the shiny bumper stickers that say, "Proud Parents of a Gifted Student." Does this mean that the regular program at their school is subpar? When smart students are in schools with low standards, they become bored and unchallenged. These students are then given tests to qualify them for the Gifted and Talented services. This makes the teachers and the parents feel better, but is it really best for the students? When schools begin ability grouping students to meet the needs of a variety of abilities they show that they do not have a robust, coherent educational program, nor do they have a vision for the best curriculum for all students.

The Liberty BOD Policy states, "Our goal is to provide a rich and balanced educational opportunity for all students. High standards are at the heart of our expectations, although we recognize every student has unique abilities, interests, and motivations. Parents encourage their child's success by monitoring progress in school and at home, and by

partcipating as fully as possible in the Liberty community. Class work and homework are designed to challenge each student to make the most of his or her talents."
When schools develop a program to enrich the curriculum for a few special students, it shows that the curriculum was not rich and rigorous enough for any of the students. This is done to cover up a school-wide curriculum deficit. All children deserve a rich, coherent curriculum that benefits *all students*. By holding all students accountable to a high standard at Liberty, we are able to challenge the students on the high end, motivate the average student to become better, and set a trajectory for success for the students that are struggling.

At Liberty, teachers will say that students are more successful because they are able to listen to these higher-level conversations between high achieving students and the teacher. Students implicitly learn taught concepts through these conversations. For example, a struggling student will understand how a math problem is solved if they hear another student or teacher explain it in class. Classes that contain students at various academic levels help fuel the discussions helping all students succeed.

Liberty Common School follows the Core Knowledge Sequence and researches other teaching methods and curriculum to provide the best education possible within a public school system. We have a large percentage of potentially gifted and talented students at Liberty Common Elementary School , and the majority of these students find Liberty challenging and rewarding.

Liberty offers many opportunities to students to further excel—both within the classroom and through extracurricular activities such as athletics, Odyssey of the Mind, Lego Robotics, forensics, club activities at the junior high and high school level, and geography and spelling bees, among others. Keep an eye out for upcoming Liberty sponsored extracurricular activities in the Common Sense newsletter. Thanks for your help at home reinforcing all the instructional material we present at Liberty every day, and thanks for sharing your gifted children with us and all the students in their classroom.

No Substitute for Knowledge

Bob Schaffer, Headmaster

As students gear up for college tests, here is one big thing to keep in mind: There is no substitute for knowledge.

The ability to complete college-level work is fundamentally what college-readiness assessments like the SAT, ACT, and other similar tests attempt to measure. High scores logically reflect the test taker's preparation throughout primary and secondary school.

Sure, there are ways to enhance scores—perhaps by a point or two—through crash-course, test-preparation programs. Developing familiarity with the test format can sometimes elevate one's confidence on exam day.

It won't, however, make you appear smarter than you actually are.

The only kind of preparation that offers an authentic advantage of legitimate college readiness is a rigorous academic program that starts early and is refined through the formative years of adolescence. Strong test takers have deep background knowledge and are inured to the drill of being tested.

Liberty's strategy is rather straightforward and logical. Starting in the early grades, Liberty offers a proven core curriculum called The Core Knowledge Sequence. This academic strategy enjoys an unparalleled track record of success here in Colorado, throughout the country, and even internationally.

On an instructional level, Liberty treats its classroom instructors like actual professionals, compensating and retaining them based upon verifiable professional results and institutional leadership. At the high-school level, Liberty Common High School is unambiguously devoted to college preparation.

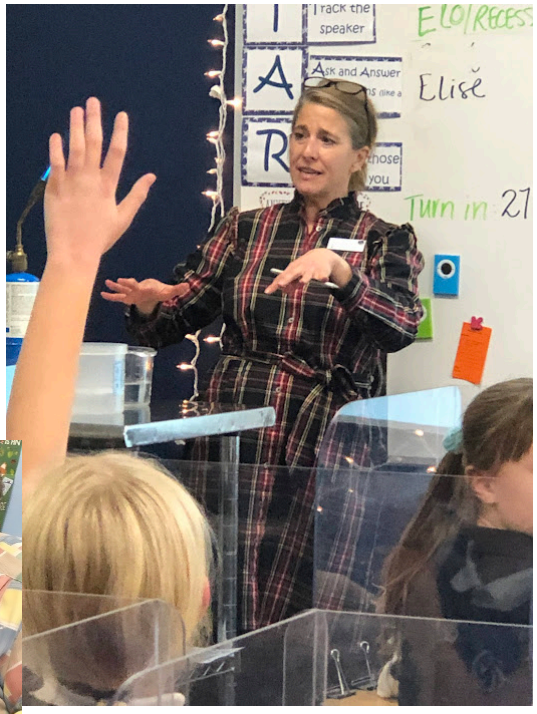
We offer courses distinctly oriented to college readiness. We consistently achieve results that are among the state's highest when compared to all Colorado high schools. Independent analyses have ranked Liberty first in the state throughout most of the school's existence.

Liberty offers high-quality college counseling, indicating we are serious about college preparation. Liberty keeps its students on track to SAT and ACT success by administering the associated pre-tests in the years leading up to their junior year in high school.

Liberty insists upon a challenging course load right through the senior year. We do not believe in shortcuts. We know the easy way through high school is the hardest way through college.

Conversely, the hard way through high school is the easiest way through college. In this regard, there truly is no substitute for knowledge.

Remember, it is the right and responsibility of parents to direct the education and upbringing of their children. Through energetic parental engagement, and a firm reliance upon common knowledge, common virtue and common sense, Liberty prepares college- bound students to shine on the SAT and ACT—and well beyond through their exciting life journeys.



Brain Rules

Bob Schaffer, Headmaster

In addition to the honor of being Liberty's Headmaster, I also have had the honor of representing Colorado's Fourth Congressional District on the Colorado State Board of Education. I served seven years on the Board, the last four of them as the Board's Chariman.

A Board colleague of mine, **Dr. Angelika Schroeder** of Boulder, recently gave me a copy of **John Medina**'s 2008 best-selling book *Brain Rules*. She even had it inscribed by the author himself, and says the book should be read by everyone in the education business.

It's just as useful to all parents of schoolchildren. After all, we're in the education business, too.

The book explains in layman's terms (in twelve rules) how the brain works. It gives lots of tips on how to improve the brain's performance and insights on how learning can be improved.

Though the book is indeed aimed at teachers in the classroom, it offers practical advice that parents can follow in an effort to help teachers and students alike. For example, oxygen is a superpower fuel for the brain.

More oxygen equals better brain performance—for everyone, all the time. Exercise, adequate sleep, and good nutrition make every brain smarter. If your kid is struggling in school, start there.

"Multitasking" is something like a suntan. It seems pretty fascinating at the time, but it's really overrated.

The brain can truly focus on only one thing at a time. Distractions impede learning. This makes a strong case for eliminating distractions.

It explains why we're sticklers for the Dress Code, being tardy, chewing gum, using cell phones, wandering off campus and other disturbances. If your scholar is not achieving his full potential, consider how you can remove distractions at home, too.

Most memory vanishes immediately. Enduring memory is fixed in the brain's cortex. Lodging it there and retrieving it entails gradual acquisition of information and reinforcement through repetition.

This helps explain why the Core Knowledge Sequence is so powerful and why the concept of "background knowledge" helps the learning process to surge through high school, college and beyond. If your student's performance is not at its peak, find strategies at home to reinforce what they're expected to know at school – even after the unit is over.

Chronic stress at home hurts brains at school. Stress stimulates the body's production of adrenaline and cortisol. Too much of these chemicals damages the heart and hippocampus.

High stress can literally cause a brain to snap. This explains why we work so purposefully at Liberty to create a safe, calm, stable, routine and predictable environment for our students.

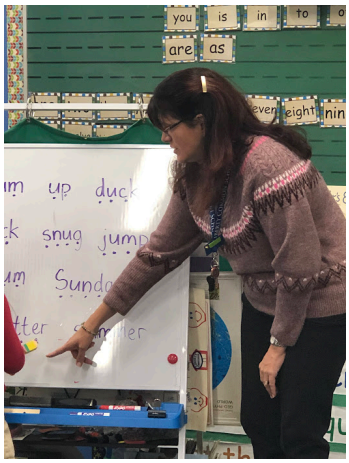
The process of education is a good kind of stress. Adding traumatic stress on top of it is counterproductive. If your household is unstable, do your best to insulate your kids from the mayhem.

To see a 45-minute video introduction to Medina's book, check online. To help make your students' brains stronger, keep supporting Liberty. Your kids will have it made in the shade.

Why Do Liberty Students Do So Much Reading?

Dr. Maureen Schaffer, parent and founder

Most American schools dedicate several hours each week to "literacy." A majority of time is spent teaching children the fundamentals of reading strategies, such as making inferences, predicting, classifying, and "looking for the main idea." The purpose of these exercises is to bolster test scores, independent of real knowl-edge. In contrast, Liberty strives to develop the appreciation of language, increase specific knowledge, and provide meaning to students through the achievement of Primary Literacy, Mature Literacy, and Moral Literacy.



Primary Literacy

Primary literacy begins with phonic recognition. Our Charter states, "Children will be provided deliberate, coherent, direct instruction in letter-sound correspondences. Practices which teach children to rely on word-memorization (the look-say method) and guessing (through illustration and/or context) will be avoided."

Once phonetic decoding skills are introduced, fluency must be developed. Fluency allows students to focus their mental energies on comprehension rather than decoding. **Fluency takes practice—a lot of it.** Selected phonics programs, stories, and books which have been approved by the BOD are used for the development of decoding skills and fluency at Liberty. While necessary for practicing early literacy skills, these books can bore students and may not develop language appreciation.

Children need to discover at an early age the peculiar satisfaction that comes from experiencing form in language, as in nursery rhymes and poetry. When this occurs, children will continue to prefer the sound of beautiful or interesting language as they later select books for meaning.

Furthermore, we believe young children should be shown incrementally what is outside their realm of experience. Children who are exposed to complex speech patterns learn to express themselves earlier and more fluently than those spoken to in careful sentences.

In the early grades nursery rhymes, poetry, fairy tales, and captivating stories, beyond the students' own reading abilities, are read aloud to children. In addition to the development of language appreciation, this practice fosters the desire in children to master the difficult skill of reading in order that the students might gain personal access to the exciting world of stories.

Mature Literacy

"*Mature literacy develops as students become acquainted with a broad and rich body of knowledge and become familiar with many well-written, diverse and meaningful works of literature.*" (LCS Charter)

According to E.D. Hirsch Jr., one reason children lag behind in reading ability, and are thus prevented from achieving mature literacy, is a huge vocabulary deficit. Hirsch advises, and Liberty advocates, time devoted to activities that "foster vocabulary, domain knowledge, and fluency."

Domain knowledge is the threshold level of knowledge needed to understand a topic. If one knows nothing of the game of baseball, for example, one can't comprehend the sentence: "Jones sacrificed and knocked in a run." The more domain knowledge acquired, the easier it becomes to read and understand a wider variety of material.

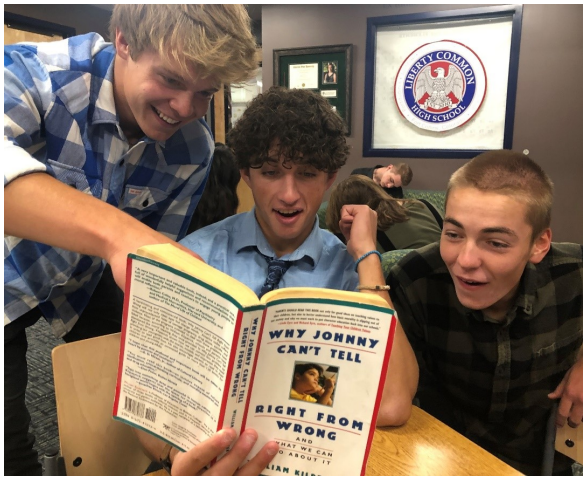
In today's schools, the teaching of the kind of specific knowledge needed to become a fully-literate individual, is woefully inadequate. The texts and literature used in most American elementary schools are, for the most part, of a trivial nature. There is no shortage of material on topics like pets and sharing, but little on history, geography, and science.

At Liberty, vocabulary and domain knowledge are developed by teaching the rich body of content knowledge defined in the Core Knowledge Sequence. Vocabulary is further developed through Greek roots and Latin language instruction.

Finally, in order to immerse students in word knowledge and expose them to many well-written, diverse and meaningful works of literature, we have supplemented the Core Knowledge Sequence with (primarily) classic works of fiction—stories which have withstood the test of time. In accordance with Liberty' s Charter, "*The literature is chosen not only for its place in the core body of knowledge, its multi-cultural representation, and its rich use of language, but also because it provides access to deeper meaning of universal human problems, particularly those which preoccupy children's minds.*"

Moral Literacy

At Liberty, character education is achieved through a program of expectations, modeling, and study of historical and literary figures.



Stories and other writings in our curriculum are intended to help children achieve moral literacy. That achievement involves recognizing the virtues, understanding what they are in practice; and developing a desire to do what is right. How is this accomplished? First, children need specific illustration of what is good and bad so that what is morally right and wrong can be known and promoted. Through the power of imagination children become vicarious participants in a story; they share in a hero's choices and challenges and identify with his suffering and triumph. Because a child's allegiances are based not so much on right versus wrong, but on who arouses his sympathy, it is important to choose stories in which virtue wins over vice, as in fairy tales and other classic works. Frequent and strong identification with virtuous and victorious heroes allow children to rehearse and strengthen their commitment to goodness.

Second, reading and literacy promote fascination. Nothing compares with a story that begins "Once upon a time…" The imaginative process gives us hope because we want to believe that in the stories of our lives we too can make the right choices.

Third, reading and literacy create a living link to our culture, its history and traditions. Fourth, by teaching domain knowledge, children will become a part of a common world, a community of moral persons. Reading affords us the opportunity to do what we can't often do in life—to become thoroughly involved in the inner lives of others. As with visiting foreign cultures, the sustained involvement with a character in a story enlarges a child's sympathies and gives them those broad, wholesome and charitable views that are the re-ward of both travel and reading.

"*…Shall we just carelessly allow children to hear any casual tales which may be devised by casual persons, and to receive into their minds ideas for the most part the very opposite of those which we should wish them to have when they are grown up? We cannot… Anything received into the mind at that age is likely to become indelible and unalterable; and therefore it is most important that the tales which the young first hear should be models of virtuous thoughts…*" PLATO's *Republic*

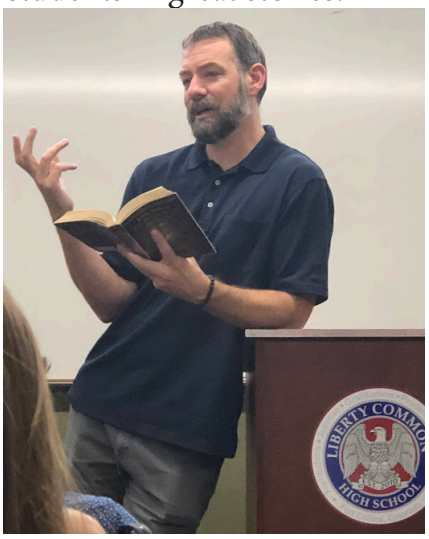
For more information on Liberty's approach to literacy, see Policy **7.13 Reading and Literacy** and Policy **7.14 Literature Acquisition.**

What is Good Literature?

Dr. Maureen Schaffer, parent and founder

The books which fill Liberty's library and classrooms are selected according to criteria beyond current popularity. The quality of language, the value of a story to the human experience, the contribution to character education, and the support of the Core Knowledge Sequence all play a role in identifying "good" books.

According to Neil Postman, whose ideas are frequently referenced in our Charter, "Human beings require stories to give meaning to the facts of existence. If our stories are coherent and plausible and have continuity, they will help us to understand why we are here, what we need to pay attention to, and what we may ignore." Our goal, then, is to immerse students in great stories.



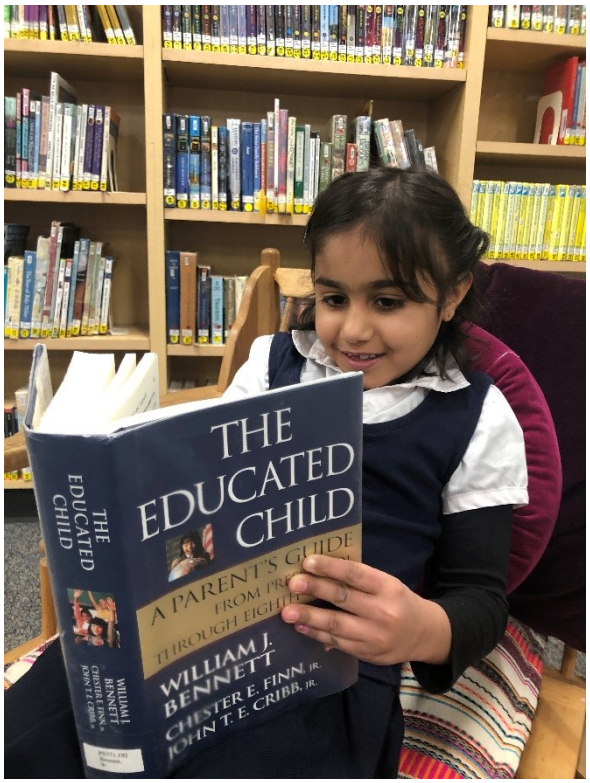
And how do we identify great stories? Great authors do not write stories so students can identify the main characters or write plot summaries. Rather, they seek to portray characters struggling with the great issues of life (e.g. truth, love, war, faith, politics, even loneliness). As our Charter states, "literature that will be introduced is chosen…because it provides access to deeper meaning of universal human problems."

We recognize these stories because they hold our interest, even as adults. We recognize these stories because the characters have something to learn. They develop and grow as the plot unfolds. We recognize these stories because readers desire to emulate their heroes. Good literature has withstood the filter of time, speaking to the universal struggles of humans throughout the ages.

Great stories are intended to be enlarging experiences, rather than cures prescribed for a given sociological, political or emotional problem. Genres that encourage narrow self-preoccupation, are void of meaningful character development, encourage acceptance of and identification with poor role models, or strive to give children "appropriate" attitudes about contemporary social issues (e.g. divorce, sex, war, gender) are avoided at Liberty. Most of the literature at Liberty is generally acknowledged as traditional classics or children's classics. To support our character education program, Liberty is filled with books providing examples, over and over again, of the reasons for living well. Liberty also strives to provide content-based non-fiction books necessary to support the Core Knowledge Sequence, student research, and parent education.

Children's 'non-books,' a prevalent trend in children's non-fiction, are composed of tiny facts and snippets of interesting material with visually pleasing photography which have no sustained narrative, carefully developed argument, or background knowledge. They require little concentration or focused thinking, but like television, are instantly accessible. The most conspicuous example of a 'non-book' is the *Guinness Book of World Records*. Such books are diverting filler and fail to meet Liberty's criteria for literature worthy of our student body.

For more information please read Policy **7.14 Literature Acquisition** and **The Case for Good Taste in Children's Books** by Meghan Cox Gurdon, The Wall Street Journal, July/August 2013, Volume 42, Number 7/8.



Your Brain on Fiction

Annie Murphy Paul, *New York Times*

Amid the squawks and pings of our digital devices, the old-fashioned virtues of reading novels can seem faded, even futile. But new support for the value of fiction is arriving from an unexpected quarter: neuroscience.

Brain scans are revealing what happens in our heads when we read a detailed description, an evocative metaphor or an emotional exchange between characters. Stories, this research is showing, stimulate the brain and even change how we act in life.

Researchers have long known that the "classical" language regions, like Broca's area and Wernicke's area, are involved in how the brain interprets written words. What scientists have come to realize in the last few years is that narratives activate many other parts of our brains as well, suggesting why the experience of reading can feel so alive. Words like "lavender," "cinnamon" and "soap," for example, elicit a response not only from the language-processing areas of our brains, but also those devoted to dealing with smells.

In a 2006 study published in the journal NeuroImage, researchers in Spain asked participants to read words with strong odor associations, along with neutral words, while their brains were being scanned by a functional magnetic resonance imaging (fMRI) machine. When subjects looked at the Spanish words for "perfume" and "coffee," their primary olfactory cortex lit up; when they saw the words that mean "chair" and "key," this region remained dark. The way the brain handles metaphors has also received extensive study; some scientists have contended that figures of speech like "a rough day" are so familiar that they are treated simply as words and no more. Last month, however, a team of researchers from Emory University reported in Brain & Language that when subjects in their laboratory read a metaphor involving texture, the sensory cortex, responsible for perceiving texture through touch, became active. Metaphors like "The singer had a velvet voice" and "He had leathery hands" roused the sensory cortex, while phrases matched for meaning, like "The singer had a pleasing voice" and "He had strong hands," did not.

Researchers have discovered that words describing motion also stimulate regions of the brain distinct from language-processing areas. In a study led by the cognitive scientist Véronique Boulenger, of the Laboratory of Language Dynamics in France, the brains of participants were scanned as they read sentences like "John grasped the object" and "Pablo kicked the ball." The scans revealed activity in the motor cortex, which coordinates the body's movements. What's more, this activity was concentrated in one part of the motor

cortex when the movement described was arm-related and in another part when the movement concerned the leg.

The brain, it seems, does not make much of a distinction between reading about an experience and encountering it in real life; in each case, the same neurological regions are stimulated. Keith Oatley, an emeritus professor of cognitive psychology at the University of Toronto (and a published novelist), has proposed that reading produces a vivid simulation of reality, one that "runs on minds of readers just as computer simulations run on computers." Fiction—with its redolent details, imaginative metaphors and attentive descriptions of people and their actions—offers an especially rich replica. Indeed, in one respect novels go beyond simulating reality to give readers an experience unavailable off the page: the opportunity to enter fully into other people's thoughts and feelings.

The novel, of course, is an unequaled medium for the exploration of human social and emotional life. And there is evidence that just as the brain responds to depictions of smells and textures and movements as if they were the real thing, so it treats the interactions among fictional characters as something like real-life social encounters.

Raymond Mar, a psychologist at York University in Canada, performed an analysis of 86 fMRI studies, published last year in the Annual Review of Psychology, and concluded that there was substantial overlap in the brain networks used to understand stories and the networks used to navigate interactions with other individuals—in particular, interactions in which we're trying to figure out the thoughts and feelings of others. Scientists call this capacity of the brain to construct a map of other people's intentions "theory of mind." Narratives offer a unique opportunity to engage this capacity, as we identify with characters' longings and frustrations, guess at their hidden motives and track their encounters with friends and enemies, neighbors and lovers.

It is an exercise that hones our real-life social skills, another body of research suggests. Dr. Oatley and Dr. Mar, in collaboration with several other scientists, reported in two studies, published in 2006 and 2009, that individuals who frequently read fiction seem to be better able to understand other people, empathize with them and see the world from their perspective. This relationship persisted even after the researchers accounted for the possibility that more empathetic individuals might prefer reading novels. A 2010 study by Dr. Mar found a similar result in preschool-age children: the more stories they had read to them, the keener their theory of mind—an effect that was also produced by watching movies but, curiously, not by watching television. (Dr. Mar has conjectured that because children often watch TV alone, but go to the movies with their parents, they may experience more "parent-children conversations about mental states" when it comes to films.)

Fiction, Dr. Oatley notes, "is a particularly useful simulation because negotiating the social world effectively is extremely tricky, requiring us to weigh up myriad interacting

instances of cause and effect. Just as computer simulations can help us get to grips with complex problems such as flying a plane or forecasting the weather, so novels, stories and dramas can help us understand the complexities of social life."

These findings will affirm the experience of readers who have felt illuminated and instructed by a novel, who have found themselves comparing a plucky young woman to Elizabeth Bennet or a tiresome pedant to Edward Casaubon. Reading great literature, it has long been averred, enlarges and improves us as human beings. Brain science shows this claim is truer than we imagined.

—Annie Murphy Paul is the author,
most recently, of *Origins: How the Nine Months Before Birth Shape the Rest of Our Lives.*

Why Does Liberty Have Great Books Reading Lists?

Dr. Maureen Schaffer, parent and founder

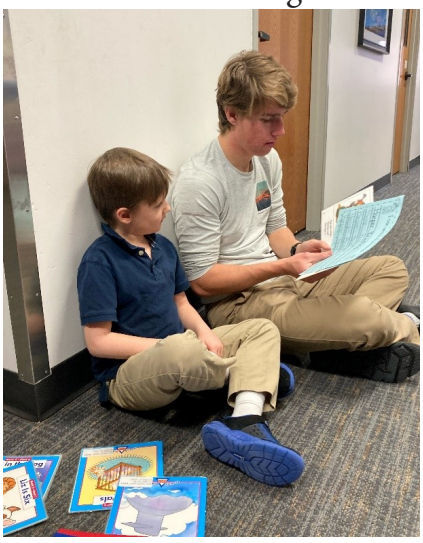
"*I don't care what my child eats, just so long as he's eating!*" How many times have we heard this familiar statement uttered by a parent? Probably never. But change *eat* to *read,* and perhaps you've considered the thought yourself.

So why does Liberty require students to select books from approved Great Books lists for required "outside" reading?

First, consider that required outside reading is actually homework. And just as math homework problems are assigned for practicing particular concepts, outside reading is assigned for a specific purpose: guiding Liberty students to *mature literacy*.

According to Liberty's charter, "*Mature literacy develops as students become acquainted with a broad and rich body of knowledge and become familiar with many well-written, diverse and meaningful works of literature.*" To support this goal, grade-level Great Books reading lists have been developed by our faculty and Academic Advisory Committee and approved by the Board.

The books on these lists are selected with consideration to exposing children to literature they might not otherwise encounter. The books are intended to nudge students toward higher levels, not just in matters of syntax and vocabulary, but also in sophistication of plot, character development, conflict and resolution, and the sustained reading of lengthy works rather than simply excerpts.



Of course, students can and should read additional books of their own choosing over and above the required reading homework. Parents are encouraged to steer their children toward selections which support the school's mission. For more information on Liberty's approach to literacy, see Policy **7.13 Reading and Literacy** and Policy **7.14 Literature Acquisition.**

Connections: Liberty Common School Reading Lists

Cherie Pedersen, LCS Teacher

"But there's so much to learn," he said, with a thoughtful frown.

"Yes, that's true," admitted Rhyme; "but it's not just learning things that's important. It's learning what to do with what you learn and learning why you learn things at all that matters."

"That's just what I mean," explained Milo as Tock and the exhausted bug drifted quietly off to sleep. "Many of the things I'm supposed to know seem so useless that I can't see the purpose in learning them at all."

"You may not see it now," said the Princess of Pure Reason, looking knowingly at Milo's puzzled face, "but whatever we learn has a purpose and whatever we do affects everything and everyone else, if even in the tiniest way."

—*The Phantom Tollbooth*

When I first started teaching, we were told that we needed to provide background knowledge. What background knowledge? Like Milo, I felt that there was so much for students to learn. Then I read E.D. Hirsch's book *Cultural Literacy*. Finally, someone answered my question. The Core Knowledge sequence outlines the background knowledge students need to be literate.

Through teaching science, history, geography, Latin, math, music, art, and literature, we are providing the background knowledge needed for students to be able to comprehend what they read and hear. E.D. Hirsch in his article *Reading Comprehension Requires Knowledge of Words, and the World* explains how background knowledge impacts reading comprehension.

"Prior knowledge about the topic speeds up basic comprehension and leaves working memory free to make connections between the new material and previously learned information, to draw inferences, and to ponder implications. A big difference between an expert and a novice reader—indeed between an expert and a novice in any field—is the ability to take in basic features very fast, thereby leaving the mind free to concentrate on important features."

As a teacher it is exciting to have a student come up and share something they found in a book that connects to content being taught in class. This year the students have found the following connections:

Wrinkle in Time – Earth tilting on its axis and spinning; Orion's belt (Astronomy Unit)

Trumpet of the Swans – saying "Rome wasn't built in a day."

Moffat's Muesum – meteor "shooting star" (Astronomy Unit); Danube River (Rivers Unit); Vini Vidi Vici (Ancient Rome)

Indian in the Cupboard – "three sisters", longhouses (Native American Unit)

Rufus M. – Medula oblongata (Human Body); Long division

Middle Moffats – Pompeii (Ancient Rome)

Old Yeller – Apache (Native Americans)

Fantastic Mr. Fox – ear wax (Human Body)

Lion, Witch and the Wardrobe – "Make it Pax" –(Ancient Rome Unit)

Charlotte's Web – Magnum Opus (Latin)

Little House on the Prairie – Laura crossed the Missouri River (Rivers Unit)

Stuart Little – Barges on the river with tow boats (Rivers Unit)

Mary Poppins Comes Back – saying "Last straw", constellations (Astronomy Unit)

Kavik – saying "Feather in your cap"

Cricket in Times Square – Yangtze River; Blue Danube song

These fantastic books are on the LCS 3rd–4th Grade Reading List. We encourage students to choose books from the reading lists for many reasons, vocabulary, rich sentence structure, depth of the story, and its connection to background knowledge.

Finally, in order to immerse students in word knowledge and expose them to many well-written, diverse and meaningful works of literature, we have supplemented the Core Knowledge Sequence with (primarily) classic works of fiction—stories which have withstood the test of time. In accordance with Liberty's Charter, "The literature suggested by the Core Knowledge Sequence, as well as other literature that will be introduced, is chosen not only for its place in the core body of knowledge, its multi-cultural representation, and its rich use of language, but also because it provides access to deeper meaning of universal human problems, particularly those which preoccupy children's minds" (LCS Literacy Policy).

In Cultural Literacy Hirsch states, "Background knowledge does not take care of itself. Reading and writing are cumulative skills; the more we read the more necessary knowledge we gain for further reading." The Core Knowledge Sequence outlines the background knowledge students need to learn in order to communicate effectively both in reading and writing. The books listed on the reading lists provide rich background knowledge, vocabulary,

and sentence structure. But even more than that, they help students see the connection with what they are learning in class. We love the excitement we see in our classrooms when our students connect content learned in the Liberty curriculum with ideas in a book they are reading from our reading list!

"You may not see it now," said the Princess of Pure Reason, looking knowingly at Milo's puzzled face, "but whatever we learn has a purpose and whatever we do affects everything and everyone else, if even in the tiniest way.

—*The Phantom Tollbooth*

An Apology for Latin and Math

Cheryl Lowe, *Memoria Press*

Many who are attracted to the idea of a classical education don't know exactly why, nor do they understand the necessity for Latin, or at least so much of it. A little bit of Latin is a good thing, but every year? Spinach is a good thing, but every day?

I think five decades of fads and experiments have made parents wary, and when they hear about classical education, they think, "Yes, that's what I want." Part of the appeal of classical education is simply the word 'classical.'

Classical is a word that has interesting associations: something that has withstood the test of time, the best, something with form, structure, and beauty, like a symphony or classical architecture. When put this way, all parents want a classical education; they want the best, the education that is time-tested, the education that has form and structure, discipline, and beauty. It sounds good to parents who are tired of the latest innovations that never seem to work.

But what is Classical Education? To be accurate, and we must be, we will use the historical meaning. This understanding of Classical Education can certainly be updated, but it cannot be radically changed. In Classical Education, the primary focus of language study is a classical language, and the primary focus of history is the classical civilizations of Greece and Rome. There are two and only two classical languages, Latin and Greek, and I will confine my comments to Latin.

Why study old dead languages and civilizations? First of all, Latin is not dead. It is still read by millions of people in every nation, and most of the classics in Latin are still in print, and many new books such as *The Grinch Who Stole Christmas* and *Winnie the Pooh* have been translated into Latin. There are many dead and dying languages in this world, but there are no more influential languages in history than Latin and Greek. It is true that they are not used for everyday conversation, but it is completely false to characterize Latin and Greek as dead languages. They are not dead—they are truly immortal.

Yes, Latin helps with SAT scores. It does make learning a modern vocabulary easier. True, Latin is abundant in the technical vocabularies of the soft and hard sciences and law. A student of Latin should also gain a firmer grasp on English vocabulary by recognizing

that all the big words come from Latin. While these benefits are impressive, they are minor compared to the real value of Latin. There are more important objectives that Latin achieves better than any other subject: The first is mental development, and the second is English language skills.

Latin develops the intellectual powers of the mind as no other subject can. Think of physical fitness, a student who is an athlete versus one who is a couch potato. The mind can be developed like the body. How does Latin do it? The best way to understand the power of Latin is to consider something you are probably familiar with—namely, math.

Math is systematic, organized, orderly, logical, and cumulative. In a cumulative study, each skill builds upon the previous one, nothing can be forgotten, everything must be remembered. All knowledge and skills are interrelated. The student continues to build a tower of learning block by block, until he has reached a very high level of skills and knowledge.

Math begins with memorization, computation, fractions, decimals, percent, word problems, and proceeds to problem solving, algebra, geometry, trig, and calculus. Math is hard because it builds so relentlessly year after year through every year of the child's education. Any skill not mastered one year will make work difficult the next year. It is unforgiving. It has to be overlearned. That is why few students reach a high level in math. They reach a glass ceiling because the cumulative nature of the subject catches up with them. Eventually they are over their heads and quit.

How does math develop the intellectual powers of the mind? Math forms the mind of the student to accuracy, logical thinking, and problem solving. It is formation, not information. Math truly educates, transforms, and changes the mind of the student to become like math, orderly, logical, accurate, organized. The true purpose of education and all of the subjects we study in school is to develop, shape, and transform the mind and character of the student. The nature of the subject transfers its character to the student's mind.

What is special about math? Math is a language, and a language is not really a subject. It is something much more basic and fundamental than a subject. Astronomy is a subject. The Civil War is a subject. Science, history, literature, government, and sociology are subjects. Subjects are by nature topical. Yes, there are basics to any subject, and, ideally, they are taught in as cumulative a way as possible. If a student doesn't do well in world history one year, however, he can pick up and do fine the next year in American history. If he zones out during the cell structure, he can wake up and knock off an "A" in the classification system of plants. If he doesn't get Hamlet, he can tune in for Macbeth. Subjects are not as demanding as languages and thus, will not produce the same caliber student.

Now what do we have on the language side of the curriculum that is comparable to and that balances the rigorous, challenging, cumulative, formative, study of math? Without Latin, the answer is "Nothing."

Math is important, but it is secondary to language skills. In fact, math is dependent upon language skills. The math teacher teaches the concepts in words, and the mathematical symbols are used in place of words so they can be easily manipulated on paper. A truly educated person can be pretty lousy at math, because language skills are still the measure of the educated person, one who can speak and write with clarity and has power over his native language, English.

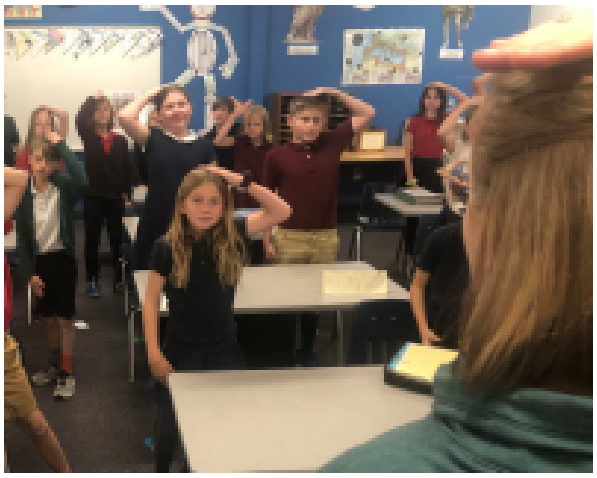
Latin provides the missing component in modern education, the systematic language training comparable to and balancing the mathematics side of the curriculum. Almost everything I said about math, you could have substituted Latin for, but not English, science, history, nor French.

Why not English grammar? English is not a classical language; it does not have the structure or form, the logic or the rules. It would be like studying modern architecture or pop music, rather than classical architecture or classical music. English doesn't follow the rules. The Romans were disciplined, and their language marched in columns, row after row, like soldiers. English is lax and loose, bending and changing wherever it fits our fancy. We are an independent, liberty-loving people, and our language shows it. Languages reflect the culture of the people who speak them. The language influences the character of the people of a nation—and likewise the language is influenced by the people.

Furthermore, students have a very difficult time studying their own language. Students have grown up with their own language; they take it for granted; they are bored by it. They are amazingly reluctant to analyze it because they can already put it to practical use instinctively. Beyond that, English grammar is abstract, whereas Latin is concrete. In Latin, you know the direct object because it is in the accusative case. In English, you have to figure it out based on the context. By teaching a language that is very different from English, the student, for the first time, really starts to see how his own language works. His own language comes alive.

What about modern languages? Like English, they are not classical; they lack the structure, form, and logical order of the classical languages. The classical languages-Latin and Greek-are so different from modern languages that they seem strange to students. They open up a whole new world and give students the ability to think about language—a very difficult task since students use language naturally. The indirect method of instruction works best with languages. Studying another language, a classical language, makes your own come to life. It allows the student to contrast and compare, to see the function of each part of speech and its role in our language. It's like putting on 3-D glasses, so that you can see how your own language works.

Latin develops and enlarges the mind to a far greater degree than math and brings the necessary balance to the curriculum. The study of Latin is a complete education in that it develops the intellectual powers of the mind and, at the same time, develops English language skills far more effectively than English grammar, thus achieving the two most important goals of education at the same time.



Latin, like math, gives the student the experience of studying one subject to a mastery level. This is what is missing in modern education, where we try to teach everything and we cover too many subjects too superficially. The student is always on the surface, always a beginner, just stuffing in a lot of unrelated facts. There are few opportunities to use higher order thinking skills when you are merely a novice.

It is only when the student has studied a subject enough to have some depth that his mind can be stretched and challenged with higher order thinking skills. Latin and math give students the invaluable experience of studying one systematic subject to a mastery level over a long period of time, K–12 and beyond. This is a key to mental and character development and is the most valuable academic experience a child can have in school. Latin and math, when taught to a mastery level, teach the student how to climb the mountain of learning. And if a student climbs one mountain, he knows what it takes to get to the top, and he will be prepared to climb all of the mountains that he will meet in life

What does it take to get to the top of the mountain? Is it great intelligence? No. It takes perseverance, hard work, stamina, will, grit. It takes a plan, a never-give-up attitude, wits, flexibility, and preparation. The education process is like sports; the teacher is a coach who can take the student to the top, the summit of his ability and prepare him for life. Latin takes the student to the top of Mt. Parnassus to survey the grassy plains below, where he frolicked as a child, and calls him to remember how little he knew years ago when he thought he knew everything. It says, “Now that you have done it once, you can overcome any future challenge you may meet.”

Latin: Don't Leave Home Without It

Tristan Van Maren, Former LCHS English Teacher

Why we have Latin at Liberty:

1. Vocabulary: 8th grade Latin supports the 8th Grade English Word Within the Word program (our Vocabulary curriculum). The cross-curricular connections between English and Latin help provide a coherent and unified curriculum for Liberty's 8th graders.

2. Grammar: A solid understanding of Latin Grammar does wonders when it comes to understanding English Grammar. Once a student has established the crucial (and regularly neglected) habit of mind to examine the form and context of words in order to discern their meaning, the riddle of English Grammar actually becomes solvable. This is not a habit of mind that fluency-oriented languages tend to cultivate. Spoken languages lead the mind towards automatic comprehension; dead languages lead the mind towards deliberate comprehension.

3. Analysis: Particularly because of the deliberate approach to language Latin tends to cultivate, deeper studies of it in 8th grade prepare LCHS students very effectively for a High School English education at Liberty, especially when it comes to writing. In 9th grade an essay on a text like the *Odyssey* or Dante's *Inferno* requires the close, analytic look at language that Latin cultivates. The ability to read critically goes hand in hand with the ability to carefully parse and interpret language. This is what Latin provides.

Even considering the language on its own terms, the practice of Latin translation works differently from the interpretation of Spanish or French. When fluency is the goal (as it is in modern languages), interpretation aims towards communicating a similar sentiment or idea. Latin translation, disregarding fluency, teaches almost nothing *but* such linguistic structure: the student's attention remains sharply focused upon using literary context to accurately discern both the structures of the language itself and the English word choices appropriate to it.

In short, Latin translation teaches one to appreciate the subtleties and nuances of one's own native tongue. Because our brains need not focus on speaking a rudimentary form of Latin, our minds instead use Latin to learn to read, write, and speak a more intelligent form of *English*.

4. Critical Thinking Skills: All English teachers want their students to be able to appreciate the beauty and power of great writing. In order to do so, however, students must be able to think critically. At its heart, "critical thinking" is not a matter of skill so much as it is the natural effort of a well-structured mind, the cultivation of which is, if not *the* primary goal, at least *one* of the primary goals of education. The tradition goes back to the medieval Trivium: to structure concepts, one learns logic; to structure language, one learns Latin.

While some might object that the English-speaking world has its own Grammar, any reasonable student will complain (and any reasonable instructor will admit) that English Grammar is an absurdly messy affair. It mixes traditions from both Romance and Germanic languages with sloppy disregard. While instruction in English Grammar will aid the student in interpreting complicated English sentences, such skills rarely translate into the ability to *produce* sentences of comparable intelligence and complexity. This is to say that English Grammar does not train the minds of its students to become well-ordered. It keeps them from common mistakes and so elevates their language, but it does not train them in structured, clear, sophisticated expression.

From an English perspective, Latin offers our 8th graders an opportunity to appreciate their native English language much more profoundly.

A second year of Latin will build up what Liberty's 8th graders learned in 7th grade. The initial conjugations and declensions don't really provide them with all that the Latin language has to offer: they need the deeper practice, the more nuanced translation skills that can only come from a more detailed study of the ablative absolute, the subjunctive mood, or the various workings of different clauses. Such an appreciation for structured language will help them greatly in their High School careers. Of course, I don't think that 8th graders without Latin are doomed to never think clearly. I simply and honestly believe that, wherever they choose to go to High School, 8th graders with two years of Latin training will have been prepared to think more clearly, to express themselves more deftly, and to read literature more deeply than their peers.

Why Does Liberty Require Latin?

Patrick Albright, Member of the Board, February 2016

My initial reaction when I heard about making 8th Grade Latin a requirement was one of skepticism. Why is this necessary? I pondered the question within the context of the discussion I had already heard, and wasn't able to solidly bring myself to commit to one side or the other.

Then I had an epiphany. I saw the question in an entirely different context, and things made sense. There were three specific foundational values that underlie Liberty's philosophy regarding the Latin question:

Content knowledge:

Teaching content to students gives them the cultural literacy and common framework to relate to others. It provides a superior foundation and context in which skills and critical thinking can be applied, rather than trying to learn skills and critical thinking in a vacuum without context.

Mutually reinforcing curriculum:

The Core Knowledge curriculum aligns topics across subject areas. For example, when second graders are learning Ancient Greece in History, they are also reading Greek stories like "Pandora's Box" and other Greek myths. In Art, they are looking at Greek art and architecture. Understanding the architecture of Ancient Greece gives context to the stories in literature. The stories give insight to the structure of Greek society. Understanding Greek history gives context to what students are reading in the stories. This mutual reinforcement both broadens and deepens the understanding and appreciation of Ancient Greece.

Emphasis on the development of modern Western Civilization:

Liberty places an emphasis on the development and evolution of modern Western Civilization. We want our students to be leaders, and to be successful leaders they need to have an understanding of how our world has been shaped. So much of our culture

and institutions have their roots in Ancient Greece and Ancient Rome, that a strong emphasis is placed on these civilizations in our curriculum.

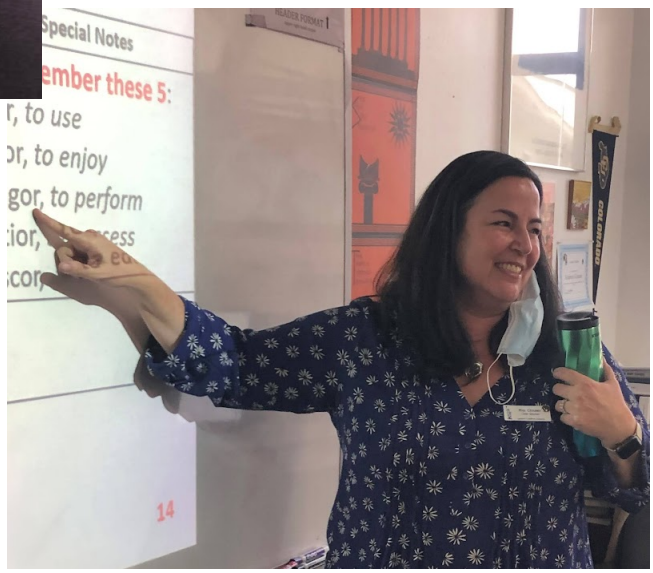
Content knowledge, mutually reinforcing curriculum, emphasis on the development of modern Western Civilization….how do these three values form a nexus at Latin, and specifically 8th Grade Latin? The discussion up until now has primarily focused on Latin being a primary contributor to the English language, aiding in English language acquisition, increasing vocabulary, and improving grammar. These are certainly very important considerations, but also incomplete.

The content of our Latin courses goes beyond simply learning the vocabulary and grammar. The courses also include historical, cultural, and geographical content as related to the Latin language. Pompeiian graffiti, letters from Julius Caesar, writings of Pliny and Cicero are examples of the type of content included in *Wheelock's Latin,* the text Liberty uses. This content not only provides the contextual knowledge for the appreciation of the Latin language itself and its influence on the English language, it is also mutually reinforcing the subject areas of history, literature, and civics, leaving our students with a deeper appreciation and understanding of our roots.

These are good arguments in favor of Latin in general, but the question still remains why Latin II in 8th Grade? From speaking with Marques Kem, coursework in Latin I is focused primarily on vocabulary and grammar. There are specific fundamentals that need to be learned in Latin I before any significant Latin literature can be appreciated, and most of the time in Latin I is spent developing those fundamentals. In Latin II, sprinkled throughout the course are all kinds of literary references to Roman history, culture, and geography. From that, I conclude that the mutually reinforcing aspects of Latin come more into play in Latin II than in Latin I.

In the 7th and 8th grades, students are still under the Core Knowledge sequence. The history curriculum in those two grades covers 1890-present: The rise of America as a world power, the World Wars, the Cold War, etc. The literature in the English curriculum in those grades serves to reinforce that time-era covered in History. When the students reach 9th grade, they are out of the Core Knowledge sequence and begin the high school history and literature track which begins with Western Civilization I and Western Literature, which heavily focus on Ancient Greece and Ancient Rome. The only link providing that historical and cultural content in the junior high years are the Latin courses. Latin I is a requirement in 7th grade, but students who do not currently take Latin II in 8th grade have a gap. Requiring Latin II will provide a logical and seamless transition from the junior high to the senior high, in addition to providing a capstone to the emphasis we place on Latin instruction throughout the Core Knowledge sequence years.

In conclusion, the content learned in Latin II includes vocabulary, grammar, historical, cultural, and geographical references that serve to increase our students contextual knowledge—which is consistent with our foundational value of teaching content knowledge. The content also serves to reinforce our other subject areas of history and literature, especially as students move into 9th Grade Western Civilization I and Western Literature—which is consistent with our foundational value of implementing a mutually reinforcing curriculum. Finally, the historical and cultural content learned in Latin II and reinforced in the 9th Grade classes deepens the appreciation and understanding of our modern Western Civilization's roots—which serves the foundational value of an emphasis on the development of modern Western Civilization. Within the context of examining Latin II from the perspective of these foundational values, adopting the Latin II requirement makes sense.



Handwriting – It's Good for Your Brain!

Laurel Van Maren, founder

This talk was originally given to the faculty and the original essay was written in longhand. It was composed first in hand-written notes, and then edited and rewritten with pen and paper. Why? Because this is an essay about what we expect our students to do with our penmanship program and it didn't make sense to type it into a computer, and use a computer editor, when we are asking our Liberty students to commit to improving their pen hand and creating something beautiful with their writing by the slow, careful work of writing things by longhand. Writing with pen and paper is a very sensory-infused experience—this is so much the case that it actually changes the way our brain works when we do it. More areas, and larger portions of those areas, do more work when we physically put pen to paper.

> *"The brain's 'reading circuit' of linked regions that are activated during reading (is) activated during hand writing, but <u>not</u> during typing."*
>
> —"Why Writing by Hand Could Make You Smarter," by Dr. William Klemm

> *"Moreover, cursive handwriting stimulates brain synapses and synchronicity between left and right hemispheres, something absent from printing, typing or keyboarding."*
>
> —"Brain Research and Cursive Writing," by Dr. David Sortino

Studies of children show that access to vocabulary, ideas, and speed are all increased when they write by hand, but not when keyboarding. In a study of sixty 2nd graders, thirty were given extra math and thirty were given extra spelling instruction. The thirty students who got the extra spelling improved in not just spelling but also sentence structure, fluency, writing, and composition skills.

Students in another often-cited study "*demonstrated that printing, cursive writing, and typing on a keyboard are all associated with distinct and separate brain patterns—and each results in a distinct end product. When the children composed text by hand, they not only consistently produced more words more quickly than they did on a keyboard, but (they) expressed more ideas. And brain imaging in the oldest subjects suggested that the connection between writing and idea generation went even further. When these children were asked to come up with ideas for a composition, the ones with better handwriting exhibited greater neural activation in areas associated with working memory—and increased overall activation in the reading and writing networks.* "

—"What's Lost as Handwriting Fades," NYTimes.com

Language is incredibly important to the brain. And the depth and form language takes when it goes from the written page as it is read, to the brain as it is processed, to the pen on paper as it is expressed, is amazing. And very profound. How we think and use language flows out of us in a very different way when it goes from the read page to the brain, and then to a keyboard.

PET and MRI technology have allowed doctors and scientists to detail the incredible changes in a child's brain when that child puts pen to paper: changes that do not happen when that child writes or composes at a keyboard. Handwriting also allows children to extract more meaning from text and lecture, to spell more accurately, and to interpret more correctly the context of words and phrases. Why? Maybe because "the brain's *reading* circuit of linked regions" that are activated during reading are also activated during handwriting—but not during typing.

Cursive handwriting also helps the two sides of the brain talk to one another, which is especially important for boys, who have a thinner corpus callosum than girls. Which students always want to print instead of use cursive? Boys. It isn't good for them and it isn't good for their brains when boys don't learn a clean, cursive pen hand that they can use now, and later as an adult.

"In dysgraphia, a condition where the ability to write is impaired, sometimes after brain injury, the deficit can take on a curious form: In some people, cursive writing remains relatively unimpaired, while in others, printing does.

> *"In alexia, or impaired reading ability, some individuals who are unable to process print can still read cursive, and vice versa — suggesting that the two writing modes activate separate brain networks and engage more cognitive resources than would be the case with a single approach."*
>
> —"What's Lost as Handwriting Fades," NYTimes.com

Do students love to use and practice good penmanship? Mostly, no. But they also don't love to make their beds, pick up after themselves, do their homework, and eat properly. As H.I. Marrou is quoted in Climbing Parnassus, "…the only point of education is to teach the child to transcend himself." Developing a good pen hand is a part of the hard work we do here in order to prepare our students to be clear thinkers and active participants in their own education.

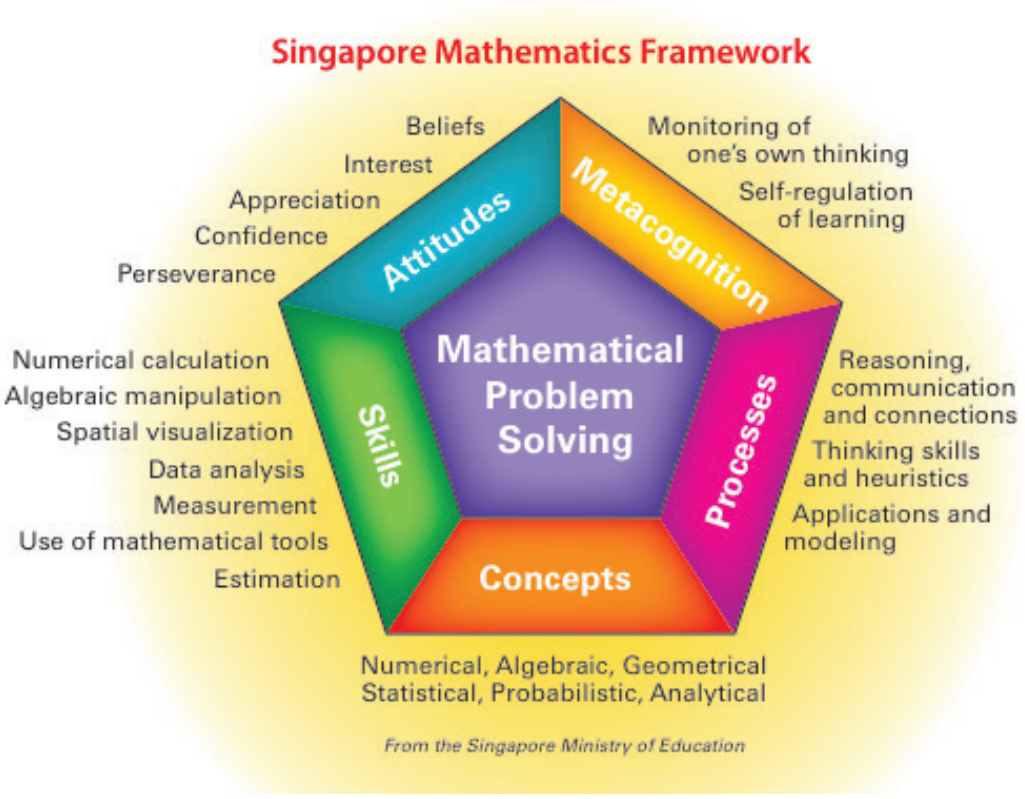
Why Singapore Math?

Bob Schaffer, Headmaster

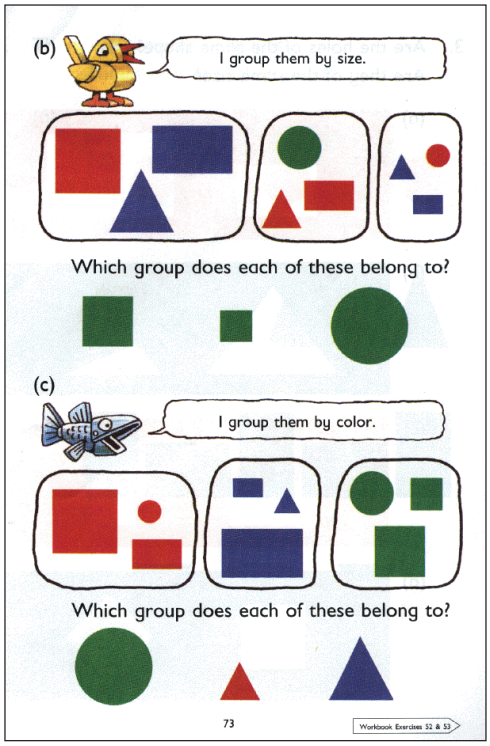
Years ago, when Liberty wanted to build a second-to-none math program, the school's Board of Directors didn't ask which school, which school district, or which state teaches math the best. No; it pursued the best math program on the entire planet.

This quest acquainted Liberty with the research and conclusions of **Liping Ma** about why Chinese students consistently outperform American ones. Ultimately, this led us to Singapore Math.

The conceptual strategies of Singapore Math align perfectly with Liberty's philosophy wherein we declare as school policy "it is not enough to assert something is true, instead teachers (and students) must be able to prove why something is true every step of the way, based on concepts the students already know and understand."



Signapore Math has given our students, in the earliest grades, the firmest advantages of a strong mathematics footing. The curricular strategy takes children through five process priorities which nicely track Liberty's "Thinking Framework:" Skills, processes (problem-solving strategies), metacognition (monitoring one's own thinking, assessment, and multiple approaches to problem solving, etc.), concepts, and attitudes (appreciation, confidence, perseverance).



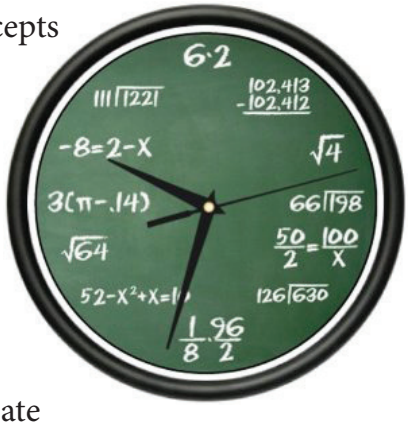
At Liberty, repetition, memorization, math facts, homework and frequent assessment are embraced. We see great benefits in developing math automaticity.

We reject the common American public-school practice of "math discovery." Rather, we favor direct instruction.

Singapore Math is used at Liberty through the 7th grade. This sets a sturdy foundation for junior-high and high-school math.

Liberty differs from most junior-high and high schools in that we seek to maintain a conceptual and skill-based approach to Algebra I, Geometry, and Algebra II.

With the introduction of the National Council of Teachers of Mathematics Standards in 1989 and the proliferation of nationalized Common Core Standards, more and more American schools are taking an "integrated" and discovery-based approach that attempts to introduce concepts by prompting a student's natural curiosity.



The approach tends to deemphasize the rigor of assigning students homework on a nightly or even regular basis. While the integrated approach can be sound, the actual implementation in America has more often regrettably defeated its own purpose.

For example, math education in the U.S. tends to become suffused with various non-math objectives in an attempt to relate prevailing math-free dogma to math. As a more reliable approach, Liberty believes arming the student with algorithm-based math (which is indeed more difficult to learn) better prepares her and him for the college-level work they'll be expected to undertake after moving on from high school.

Stringing together a conceptual approach inherent with Singapore Math, plus skill-based automaticity, plus mastery of the traditional algorithms gives our students a relevant and

powerful advantage for college—and for living the good life. Moreover, we find this strategy actually equips the student with multiple approaches to solving problems.

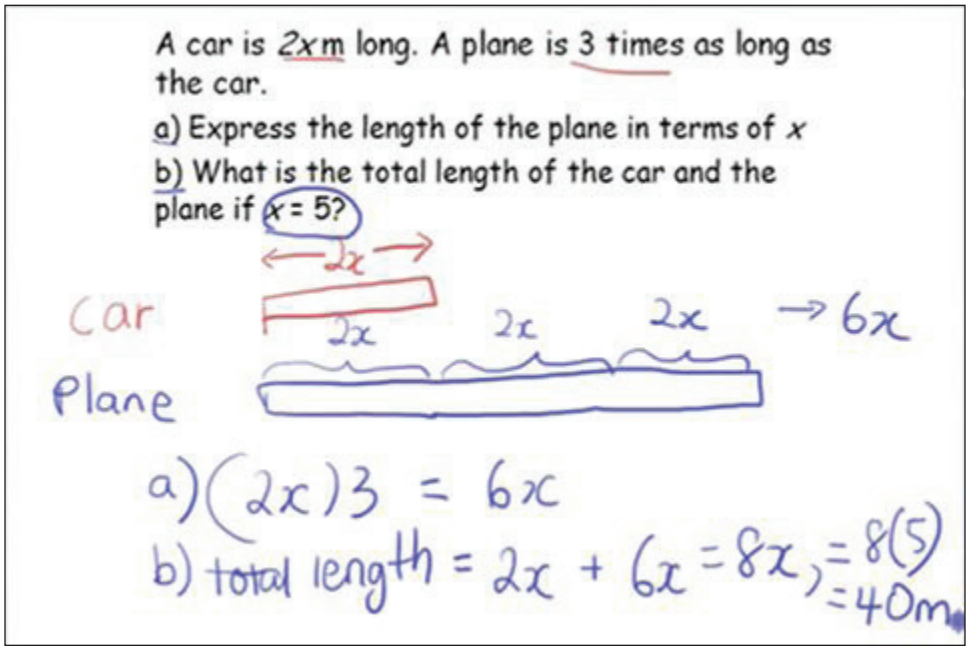
It broadens one's reasoning capacity. We believe Liberty's policy makes sense—especially in the broader sequence of Core Knowledge followed by a focused college-preparatory high school—regardless of whether the student pursues a math-dependent major in college.

Mathematicians **Alice Crary** and **W. Stephen Wilson** lay out an excellent argument and justification for this philosophy in a *Wall Street Journal* article they jointly penned on the topic. Their findings are offered within the context of understanding how new nationalized Common Core Standards are warping public-school strategies for mathematical education, and suggesting what serious schools ought to do to maintain more prudent math objectives.

As parents committed to directing the education and upbringing of our children, we are naturally drawn to higher, research-based, internationally benchmarked goals for our math students. It is important for everyone associated with Liberty to understand and support the school's math policy, especially now as Colorado and most other states are swept by faddish experimentation.

Liberty Common was among the first schools in America to discover and import Singapore Math. We have played a leadership role in perfecting its implementation in the U.S., and empowering our students with a truly world-class and internationally benchmarked math strategy.

Singapore Math works for Liberty students. The results speak for themselves.



Looking East for Math Techniques

Approach Initiated in Japan, Singapore Guides U.S. Pupils

Valerie Strauss, staff writer, *Washington Post*

It's lunchtime at the District's Hardy Middle School, and Alex Liew, 14, walks into a quiet classroom where three other students, heads down, are scribbling intently at a table. None of them is there to eat. They are attacking one multiplication problem after another—drilling just as children do in Japan.

In Baltimore, 25 students at Robert Poole Middle School are in a pilot program learning math from textbooks filled with old-fashioned drawings. The books were chosen for one reason: They are the same ones used by schools in Singapore.

While the United States may be the envy of the world in many things, math education is not one of them. An extensive international study in the late 1990s confirmed that in that subject, U.S. students are well behind the world's leaders: Singapore, Korea and Japan.

Since then, a growing number of American educators have started looking to Asia to help rescue this country from its math doldrums. After battles over old, new and new-new math, some U.S. teachers and school officials are convinced that borrowing from Asia's curriculum is the key to improving American students' performance.

Singapore math and the Japanese math curriculum known as "Kumon"—the method being used at the lunch-hour session at Hardy—are the two Asian approaches that have made the most inroads in U.S. schools.

The main distributor for Singapore math textbooks in the United States—a store in Portland, Oregon—said sales of the books have increased more than sevenfold in the past few years. Professors in Wisconsin and Illinois are training math teachers in the Singapore approach. And on the heels of the two-year-old Baltimore experiment, Montgomery County Superintendent Jerry D. Weast has approved a $50,000 pilot program for next fall at five elementary schools.

"I am familiar with almost every math program there is, and I really do believe in my heart of hearts it is far and above any other textbook math program," Nora Flood, director

of Madison Country Day School in Wisconsin, said of the Singapore books, which her school began using three years ago.

The Kumon method, used as a supplemental curriculum, has spread to nearly 3,000 students at 45 Kumon Math and Reading Centers in the Washington area and more than 109,000 students in North America.

Both approaches have their share of critics. The notion that importing a foreign curriculum can cure America's math ills ignores the cultural factors that play a role in student performance, some educators say. They also note that Asian math teachers generally are better trained than their American counterparts--most elementary school math instructors in Asia teach only math. And they warn that if these new approaches are forced on U.S. teachers without an adequate training program--as so often happens with education fads in America—math scores will fall even lower.

Proponents of Singapore math agree that American teachers must be trained in the technique, but they view much of the criticism as little more than whining.

"It's just good solid mathematics," said Richard Askey, professor of math at the University of Wisconsin at Madison. "It's done in a quite responsible way."

The Singapore and Kumon curricula promote a versatility in basic math skills that makes it easier for students to venture later into more difficult problem-solving, advocates say. The curriculum used in most U.S. schools, they contend, pays superficial attention to a wide range of math concepts but fails to delve too deeply into any of them—or to carefully connect one concept to the next.

Teachers who have taught from the Singapore textbook say they are struck by the way it moves from basic to more advanced math concepts in a logical sequence. An instructor can tell the best students to jump ahead to the next chapter, while teachers using a U.S. math textbook often move through the sections in an order that's unpredictable.

The Baltimore pilot program, which covers four classes at three middle schools, has drawn rave reviews from students and teachers.

"These books are just rich with really neat problems that keep the kids motivated," said Felicity Ross, a teacher at Poole. Her seventh-grade math class just finished a unit introducing algebra.

Still, Keith R. Jones, coordinator of Montgomery's elementary math program—and the official responsible for setting up the pilot program Weast has ordered—has some concerns about the Singapore curriculum. "It is not a fix-it," Jones said. "It is not a be-all and end-all."

He worries, for example, that the Singapore books use British English and foreign names (Minglei and Maila instead of Jimmy and Bobby) that American students could stumble over. And he points out that the books aren't aligned with the state's math curriculum or its tests--the Maryland School Performance Assessment Program, or MSPAP.

But others say that if students learn solid, basic math, they should be able to pass any standardized test. Students in Taiwan, for example, were given the MSPAP math and science exams in 1998 and outscored Maryland children--even though the Taiwanese instructors didn't teach to that test.

The aim of Kumon, like that of Singapore math, is to ensure mastery over basic skills so that the student will have a foundation for creative thinking. Its sequencing, too, is praised as being more logical than that found in U.S. textbooks. Students do their Kumon drills either before or after school.

Kumon program director Anna Hitri conducts the daily sessions at Hardy. Students work on their own and repeat problems until they achieve "mastery"—no errors within a certain time period. Hitri also oversees a program at Whittier Elementary School in the District in which 100 youngsters arrive at 8 a.m. every day for math drills.

Anna Yuwen, 8, a third-grader at Montgomery's Rock Creek Valley Elementary School, loves her after-school sessions at the Kumon Math and Reading Center in Rockville. "I learn more [at Kumon] than my school teaches me, and I feel good about it," she said.

For the latest news and online discussions about schools and parenting, go to www. washingtonpost.com and click on "Education."

Knowing and Teaching Elementary Mathematics

Richard Avery, *American Educator*

The title of this article is also the title of a remarkable new book written by Liping Ma.[1] The basic format of the book is simple. Each of the first four chapters opens with a standard topic in elementary school mathematics, presented as a part of a situation that would arise naturally in a classroom. These scenarios are followed by extensive discussion by teachers regarding how they would handle each problem, and this discussion is interspersed with commentary by Liping Ma.

Here are the four scenarios:

Scenario 1: Subtraction with Regrouping

Let's spend some time thinking about one particular topic that you may work with when you teach: subtraction with regrouping. Look at these questions:

52	91
– 25	– 79

How would you approach these problems if you were teaching second grade? What would you say pupils would need to understand or be able to do before they could start learning subtraction with regrouping?

Scenario 2: Multidigit Multiplication

Some sixth-grade teachers noticed that several of their students were making the same mistake in multiplying large numbers. In trying to calculate

123
x 645

the students seemed to be forgetting to "move the numbers" (i.e., the partial products) over on each line. They were doing this: instead of this:

123	123
x 645	x 645
615	615
492	4920
738	73800
1845	79335

While these teachers agreed that this was a problem, they did not agree on what to do about it. What would you do if you were teaching sixth grade and you noticed that several of your students were doing this?

Scenario 3: Division by Fractions

People seem to have different approaches to solving problems involving division with fractions. How do you solve a problem like this one?

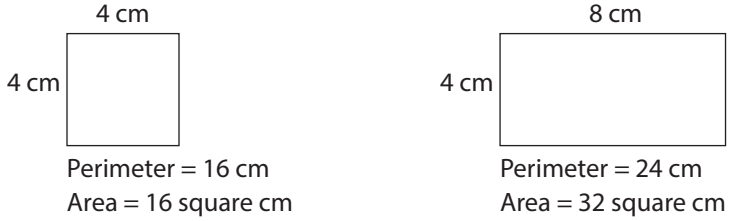
$1\frac{3}{4} \div \frac{1}{2}$

Imagine that you are teaching division with fractions. To make this meaningful for kids, something that many teachers try to do is relate mathematics to other things. Sometimes they try to come up with real-world situations or story problems to show the application of some particular piece of content. What would you say would be a good story or model for $1\frac{3}{4} \div \frac{1}{2}$?

Scenario 4: The Relationship Between

Perimeter and Area

Imagine that one of your students comes to class very excited. She tells you that she has figured out a theory that you never told the class. She explains that she has discovered that as the perimeter of a closed figure increases, the area also increases. She shows you this picture to prove what she is doing:



How would you respond to this student?

The 20- to 30-page discussions that follow each of these four problems are the richest examples I have encountered of teachers explaining what it means to really know and be able to teach elementary school mathematics. As the word "understanding" continues to be bandied about loosely in the debates over math education, this book provides a much-needed grounding. It disabuses people of the notion that elementary school mathematics is simple—or easy to teach. It cautions us, as Ma says in her conclusion, that "the key to reform...[is to] focus on substantive mathematics." And at the book's heart is the idea that student understanding is heavily dependent on teacher understanding. We can all learn from this book.

The problem that best illustrates the insights in this book is the one about the division of fractions. For that reason and because of space limitations, I will confine my comments in this article to that problem.

The teachers Ma interviewed composed numerous story problems to illustrate fractional division. They also explained the mathematical reasoning that underlies the calculation of division of fractions. And they provided mathematical proofs for their calculation procedures.

Before giving examples of story problems composed by the teachers Ma interviewed, it is worthwhile to give a general picture of different types of division problems, using whole numbers:

- 8 feet / 2 feet = 4 (measurement model)
- 8 feet / 2 = 4 feet (partitive model)
- 8 square feet / 2 feet = 4 feet (product and factors)

Now if we substitute fractions, using 1¾ in place of 8 and ½ in place of 2, these categories can be illustrated by the following examples:

- How many ½ foot lengths are there in something that is 1 and ¾ feet long?
- If half a length is 1 and ¾ feet, how long is the whole?
- If one side of a 1¾ square foot rectangle is ½ feet, how long is the other side?

Many other examples are given in Ma's book to represent this division problem. Here are two examples that use the measurement model:

> Given that a team of workers construct ½ km of road each day, how many days will it take them to construct a road 1¾ km long?
>
> Given that ½ apple will be a serving, how many servings can we get from 1¾ apples? (p. 73)

Many of the teachers favored the partitive model of division. Here are some of the story problems they composed based on that model:

> Yesterday I rode a bicycle from town A to town B. I spent 1¾ hours for ½ of my journey; how much time did I take for the whole journey?
>
> A factory that produces machine tools now uses 1¾ tons of steel to make one machine tool, ½ of what they used to use. How much steel did they used to use for producing one machine tool?
>
> We want to know how much vegetable oil there is in a big bottle, but we only have a small scale. We draw ½ of the oil from the bottle, weigh it, and find that it is 1¾ kg. Can you tell me how much all the oil in the bottle originally weighed? (p. 79)

These are illuminating examples. They show the teachers' deep mathematical knowledge and their ability to represent mathematical problems to students. The latter has been called "pedagogical content knowledge."

It is important for students to learn both how to translate mathematical expressions into verbal problems and how to translate verbal problems into mathematical expressions that can be worked with. It is also important for students to understand how to do the calculation of division of fractions, and why this calculation works. Just telling students to "invert and multiply" is not enough. The following quotation from one of the teachers Ma interviewed starts with a brief statement about the relationship between division and multiplication. This statement provides a background for the story problem that follows.

> Division is the inverse of multiplication. Multiplying by a fraction means that we know a number that represents a whole and want to find a number that represents a certain fraction of that. For example, given that we want to know what number represents ½ of 1¾, we multiply 1¾ by ½ and get 7/8. In other words, the whole is 1¾ and ½ of it is 7/8. In division by a fraction, on the other hand, the number that represents the whole becomes the unknown to be found. We know a fractional part of it and want to find the number that represents the whole. For example, if ½ of a jump rope is 1¾ meters, what is the length of the whole rope? We know that a part of the rope is 1¾ meters, and we also know that this part is ½ of the rope. When we divide the number of the part, 1¾ meters, by the corresponding fraction of the whole, ½, we get the number representing the whole, 3½ meters.… But I prefer not to use dividing by ½ to illustrate the meaning of division by fractions. Because one can easily see the answer without really doing division by fractions. If we say 4/5 of a jump rope is 1¾ meters, how long is the whole rope? The division operation will be more significant because then you can't see the answer immediately. The best way to calculate it is to divide 1¾ by 4/5 and get 23/16 meters. (p. 74)

This is a rich passage. The teacher begins by reminding her students that division is the inverse of multiplication. She then reviews what it means to multiply fractions, a topic that her students have already studied. Then building on their previous knowledge, the teacher offers an example that moves her class smoothly and logically to the division of fractions.

But this teacher is not content with the problem the interviewer gave her, 1¾ ÷ ½. She fears it will allow her students to "see the answer without really doing division by fractions." She substitutes a different problem—1¾ ÷ 4/ 5— one that her students cannot easily visualize, thus forcing them deeper into the mathematics of the division of fractions.

This teacher is telling us something important about the level of knowledge needed if that knowledge is to be stable rather than fragile. If all that is expected of students is that they have a picture of how to deal with simple fractions like ½ and 3½, their knowledge will not be deep enough to build on. Likewise, if their knowledge is limited to the computational

procedure without any idea why the procedure works, this is also not enough to build on. Students need both.

Like the teacher quoted above, many of the other teachers Liping Ma interviewed used the explanation that division is the inverse of multiplication. However, Ma points out that the teachers who used this explanation preferred the phrase "dividing by a number is equivalent to multiplying by its reciprocal." That is, one can do division by multiplying by the reciprocal (or inverse) of the number being divided by. This is the mathematical reasoning that lies behind the "invert and multiply" computation.

Some of the teachers interviewed offered a formal mathematical proof to show why the algorithm for division of fractions works:

> OK, fifth-grade students know the rule of "maintaining the value of a quotient." That is, when we multiply both the dividend and the divisor with the same number, the quotient will remain unchanged. For example, dividing 10 by 2 the quotient is 5. Given that we multiply both 10 and 2 by a number, let's say 6, we will get 60 divided by 12, and the quotient will remain the same, 5. Now if both the dividend and the divisor are multiplied by the reciprocal of the divisor, the divisor will become 1. Since dividing by 1 does not change a number, it can be omitted. So the equation will become that of multiplying the dividend by the reciprocal of the divisor. Let me show you the procedure:
>
> $$1\frac{3}{4} \div \frac{1}{2} = (1\frac{3}{4} \times 2/1) \div (\frac{1}{2} \times 2/1)$$
> $$= (1\frac{3}{4} \times 2/1) \div 1$$
> $$= 1\frac{3}{4} \times 2/1 = 3\frac{1}{2}$$
>
> With this procedure we can explain to students that this seemingly arbitrary algorithm is reasonable. (p. 60)

This is what Ma said of the teachers who offered proofs: "Their performance is mathematician-like in the sense that to convince someone of a truth one needs to prove it, not just assert it."

Many of the teachers Ma interviewed emphasized the necessity of thorough mastery of a topic before moving on to the next. In this instance, solid command of the multiplication of fractions was considered a "necessary basis" for approaching the division of fractions.

> The meaning of multiplication with fractions is particularly important because it is where the concepts of division by fractions are derived.... Given that our students understand very well that multiplying by a fraction means finding a fractional part of a unit, they will follow this logic to understand how the models of its inverse operation work. On the other hand, given that they do not have a clear idea of what multiplication with fractions means, concepts of division by a fraction will be arbitrary for them and very difficult to understand. Therefore, in order to let our students grasp the meaning of division by fractions,

> we should first of all devote significant time and effort when teaching multiplication with fractions to make sure students understand thoroughly the meaning of this operation.... Usually, my teaching of the meaning of division of fractions starts with a review of the meaning of multiplication with fractions. (p. 77)

This description shows an appreciation of how new knowledge is built on old knowledge. The insistence on mastery of a topic before moving on to the next stands in sharp contrast to the curriculum organization known as the "spiral curriculum." In the "spiral" approach to learning, mastery is not expected the first time, and the same topics are revisited in two, three, and even four successive years.

In her discussion of the division of fractions, Ma mentions other methods of doing the calculation, including changing the problem to decimals, and dealing with numerators and denominators separately. The teachers who suggested these methods also noted that they were not always easier than the standard textbook method of multiplying by the reciprocal. The level of knowledge expected is illustrated by the following quotation:

> The teachers argued that not only should students know various ways of calculating a problem but they should also be able to evaluate these ways and to determine which would be the most reasonable to use. (p.64)

Throughout her book, Ma provides illustrations that help show how the topic under consideration fits into the larger picture of elementary mathematics. For example:

> The learning of mathematical concepts is not a unidirectional journey. Even though the concept of division by fractions is logically built on the previous learning of various concepts, it, in turn, plays a role in reinforcing and deepening that previous learning. For example, work on the meaning of division by fractions will intensify previous concepts of rational number multiplication. Similarly, by developing rational number versions of the two division models, one's original understanding of the two whole number models will become more comprehensive. (p.76)

As the reader might have suspected from the measurement units used in some of the story problems, the teachers who were quoted are from a country that uses the metric system. The country is China, and these teachers live in Shanghai and neighboring areas of China. Liping Ma grew up in Shanghai until she was in the eighth grade, when China's "Cultural Revolution" sent her to the countryside for "re-education" by the peasants. In the poor rural village in South China where she was sent, the mostly illiterate villagers wanted their children to get an education. Ma

was asked to teach, which she did for seven years, and later became elementary school superintendent for the county. Later she returned to Shanghai and started to read the classical

works in the field of education. This eventually led her to Michigan State University (MSU) where she began working on a doctoral degree.

While at MSU, Liping Ma worked on a project run by Deborah Ball, which was a study to find out more about the mathematical knowledge of elementary school teachers in the United States. The four questions Ma used in her interviews with Chinese teachers were originally developed by Ball as part of the MSU study, and first used to interview U.S. teachers.[2] In her book, Ma draws on this database of U.S. teacher interviews as a point of comparison to the Chinese teachers.

The U.S. teachers fared poorly when compared to their Chinese counterparts. For the division of fractions problem discussed in this article, some of the U.S. teachers had difficulties with the calculations. None of them could adequately explain the mathematical reasoning embedded in the algorithm, provide appropriate real-world applications, or offer proofs.

It was not surprising to find that our elementary teachers' mathematical knowledge is not nearly as robust as that of the Chinese teachers. How could it be otherwise? Where could our teachers possibly have acquired the knowledge base that the Shanghai teachers demonstrated? Not from their own K-12 schooling, which focused mainly on developing a little skill on routine problems. Not from the math methods courses U.S. colleges offer, since these are light on math content. And—what may be surprising to many people—not even from the math courses they might have taken from a university mathematics department. At most colleges and universitites, there is a major disconnect between what is taught in these courses and the kind of math elementary school teachers need. As H. Wu has written: "There is an alarming irrelevance in the present preservice professional development in mathematics."[3]

A high school teacher who took a course from the well-known mathematician George Polya put it another way:

> The prospective teacher is badly treated both by the mathematics department and by the school of education. The mathematics department offers us tough steak which we cannot chew and the school of education vapid soup with no meat in it.[4]

It is not just the courses for high school math teachers that are problematic. Courses for prospective elementary school teachers, for example, frequently slight material dealing with fractions since whole number arithmetic is the main focus in our elementary schools. Middle school teachers frequently fall between the cracks. The material they will be teaching is not taught in detail to either prospective elementary school teachers or to prospective high school teachers; there are no courses specifically for middle school teachers.

If not from their pre-college education and not from their college education, where else might a U.S. teacher have acquired a deep understanding of mathematics? Perhaps from the textbooks and teachers' guides they use in their teaching. Liping Ma reports that Chinese teachers spend considerable time studying the textbooks:

> Teachers study textbooks very carefully; they investigate them individually and in groups, they talk about what textbooks mean, they do the problems together, and they have conversations about them. Teachers' manuals provide information about content and pedagogy, student thinking, and longitudinal coherence. (p. 149)

Unfortunately, there are very few of our textbooks that a teacher would profit much from studying.

The U.S. Department of Education has just announced the results of an exercise to identify "exemplary" and "promising" texts. *Connected Mathematics,* a series for grades 6–8, is one the department has deemed exemplary. I do not understand why it deserves that rating. I am quite familiar with this series, as I reviewed it as part of a textbook adoption process. Regarding fractions, for example, *Connected Math* has some material on the addition and subtraction of fractions, but nothing as systematic as described by the Chinese teachers interviewed by Ma. There is less on multiplication of fractions, and nothing on the division of fractions. If our students go through grade 8 without having studied the division of fractions, where are our future primary teachers going to learn this? The criteria used by the Department of Education review should be rewritten now that Liping Ma's book has provided us with a model of what school mathematics should look like.

Another recent development that leaves me less than encouraged is the way fractions are addressed in the draft of the revised K-12 mathematics standards released last year by the National Council of Teachers of Mathematics (*Principles and Standards for School Mathematics: Discussion Draft*[5]). Most of the work on fractions has been put in the grades 6 to 8 band. Students are to "develop a deep understanding of rational number concepts and reasonable proficiency in rational-number computation." It is the adjective "reasonable" that bothers me. Proficiency should be the goal. It is hard to imagine the Chinese teachers that Ma interviewed settling for "reasonable" proficiency with fractions for their students. These lower expectations show in every international comparison.

Furthermore, the only problem used to illustrate division of fractions in NCTM's draft revision is how many pieces of ribbon ¾ yards long can be cut from 4½ yards of ribbon. The text continues with: "The image is of repeatedly cutting off ¾ of a yard of ribbon. Having students work with concrete objects or drawings is helpful as students develop and deepen their understanding of operations." It seems that we are back again to simple

fractions and concrete objects that students can visualize. Contrast this with what Liping Ma observed:

> The concept of fractions as well as the operations with fractions taught in China and the U.S. seem different. U.S. teachers tend to deal with "real" and "concrete" wholes (usually circular or rectangular shapes) and their fractions. Although Chinese teachers also use these shapes when they introduce the concept of a fraction, when they teach operations with fractions they tend to use "abstract" and "invisible" wholes (e.g., the length of a particular stretch of road, the length of time it takes to complete a task...). (p. 76)

The last three chapters in Liping Ma's book deal with when the Chinese teachers acquired the knowledge they showed, and a description of what Ma calls "Profound Understanding of Fundamental Mathematics," or PUFM. Here is part of her description:

> A teacher with PUFM is aware of the "simple but powerful" basic ideas of mathematics and tends to revisit and reinforce them. He or she has a fundamental understanding of the whole elementary mathematics curriculum, thus is ready to exploit an opportunity to review concepts that students have previously studied or to lay the groundwork for a concept to be studied later. (p. 124)

From their pre-collegiate studies, the Chinese teachers Ma interviewed had a firm base of knowledge on which to build. However, PUFM did not come directly from their studies in school, *but from the work they did as teachers.* These teachers did not specialize in mathematics in "normal" school, which is what their teacher preparation schools are called. But after they started teaching, most of them taught only mathematics or mathematics and one other subject. This allowed them to specialize in ways that few of our elementary school teachers can. Quite a few regularly changed the level at which they taught. They might go through a cycle of three grades, then repeat the same cycle, or change and teach a different age group. This allows them to see the development of mathematics from the perspective of a teacher, something too few of our elementary school teachers are able to do.

Recently, the Learning First Alliance—an organization composed of many of the major national education organizations—recommended that beginning in the fifth grade, every student should be taught by a mathematics specialist.[6] This is a hopeful development, and for many teachers it would mean unburdening themselves from something they now find difficult and unpleasant.

There is more we can do. Our teachers need good textbooks. They need much better teachers' manuals. As noted before, our college math courses for future teachers at all levels need to be improved. And just ask any teacher who has sat through mindless "workshops" whether our in-service "professional development" isn't long overdue for major overhaul.

Teachers also need *time* to prepare their lessons and further their study of mathematics. Recall Ma's comments that it is *during* their teaching careers that Chinese teachers perfect their knowledge of mathematics. Listen to this Shanghai teacher describe his class preparation:

> I always spend more time on preparing a class than on teaching, sometimes three, even four, times the latter. I spend the time in studying the teaching materials: What is it that I am going to teach in this lesson? How should I introduce the topic? What concepts or skills have the students learned that I should draw on? Is it a key piece on which other pieces of knowledge will build, or is it built on other knowledge? If it is a key piece of knowledge, how can I teach it so students can grasp it solidly enough to support their later learning? If it is not a key piece, what is the concept or the procedure it is built on? How am I going to pull out that knowledge and make sure my students are aware of it and the relation between the old knowledge and the new topic? What kind of review will my students need? How should I present the topic step-by-step? How will students respond after I raise a certain question? Where should I explain it at length, and where should I leave it to students to learn it by themselves? What are the topics that the students will learn which are built directly or indirectly on this topic? How can my lesson set a basis for their learning of the next topic, and for related topics that they will learn in their future? What do I expect the advanced students to learn from the lesson? What do I expect the slow students to learn? How can I reach these goals? etc. In a word, one thing is to study whom you are teaching, the other thing is to study the knowledge you are teaching. If you can interweave the two things together nicely, you will succeed. We think about these two things over and over in studying teaching materials. Believe me, it seems to be simple when I talk about it, but when you really do it, it is very complicated, subtle, and takes a lot of time. It is easy to be an elementary school teacher, but it is difficult to be a good elementary school teacher. (p. 135)

Liping Ma's book provides a start to what I hope will be a continuing study of fundamental mathematics and the connections between different parts of it. We need many more commentaries on the teaching of mathematics like those contained in Ma's book. We also need more detailed lesson plans, as are frequently provided in Japan.[7] There are a few places where one can read comments by U.S. teachers or by mathematics education researchers. However, these comments almost all deal with the initial steps of an idea, which typically means using pictures or manipulatives to try to get across the basic concept. Almost never is there elaboration of what should be done next, to help develop a deeper view of the subject, which will be necessary for later work.

And elementary school mathematics is much deeper, more profound, than almost everyone has thought it to be. As Ma comments, toward the end of her book:

> In the United States, it is widely accepted that elementary mathematics is "basic," superficial, and commonly understood. The data in this book explode this myth. Elementary

> mathematics is not superficial at all, and any one who teaches it has to study it hard in order to understand it in a comprehensive way. (p. 146)

But, she concludes:

> The factors that support Chinese teachers' development of their mathematical knowledge are not present in the United States. Even worse, conditions in the United States militate against the development of elementary teachers' mathematical knowledge.... (p.xxv)

This must change. We cannot continue to abandon teachers at every critical stage of their development and then send them into the classroom with a mandate to "teach for understanding." This is dishonest and irresponsible. As things stand now, we are asking teachers to do the impossible. They and the students they teach deserve better.

—Richard Askey is John Bascom Professor of Mathematics at the University of Wisconsin-Madison. In addition to work on special functions, he has a long term interest in the history of mathematics, and of the life and work of the great Indian mathematician Srinivasa Ramanujan.

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Math Fact With-it-ness

Casey Churchill, LCS Principal

When observing our teachers, I will sometimes discuss with them my observation of good "withitness." I describe this quality as a teacher who can manage multiple things all at once. They are able to keep various balls up in the air while maintaining continuity of instruction. I will tell them, it is like driving your car, while eating a burrito, and putting on eyeliner. *Yes, I have seen this.*

When we first learned to drive a car, we had to focus on everything. Hands need to be at 2 and 10, put car in gear, lightly push on the accelerator, etc. With hours and hours of practice, all of these steps became second nature. These cumbersome tasks became easy as we became expert drivers. Now that we are all pros at this skill, little energy is exerted to drive a car. So little, we day dream or think about our day. Our goal here at Liberty is to do the same with math facts for our children.

Math-fact automaticity is the ability to immediately recognize addition, subtraction, multiplication, and division of numbers 0 through 12. Automaticity allows students to focus their mental energies on the demands of more difficult math concepts. Just as a student cannot appreciate great works of literature if she is consumed with phonetically "sounding out" the words on the page, a student cannot fully grasp complex mathematical concepts if her mind is consumed with the simple arithmetic involved. In addition (no pun in-tended), math-fact automaticity saves students from frustration and simple errors as math concepts become more challenging. As a former 6th- grade teacher, I know this all too well.

Just as we have curriculum maps outlining content taught throughout the year, we also have speed goals for math facts. These are established for all grades at Liberty Common Elementary to help students develop math fact automaticity. Teachers have target goals for each grade level ensuring students are prepared to move on to the next grade level. Below are Liberty's math-fact speed goals.

NOTE: FPM = Facts Per Minute

Grade	Addition	Subtraction	Multiplication	Division
K	Not Tested	Not Tested	Not Tested	Not Tested
1*	Not Timed to 9+9	Not Timed to 18-9	Not Tested	Not Tested
2**	20 FPM to 9+9	20 FPM to 18-9	Not Tested	Not Tested
3	20 FPM to 9+9	20 FPM to 18-9	15 FPM to 9´9	15 FPM to 81¸9
4	25 FPM to 10+10	25 FPM to 18-9	20 FPM to 12´12	18 FPM to 144¸12
5	30 FPM to 10+10	30 FPM to 20-10	25 FPM to 12´12	25 FPM to 144¸12
6	35 FPM to 12+12	35 FPM to 20-10	35 FPM to 12´12	35 FPM to 144¸12

*__1st Grade__ tests are limited to 15 min. and number lines are not available during the second semester
**__2nd Grade__ only tests during the second semester

Becoming fluent with math facts takes practice! Just as good readers become better by reading, good mathematicians become better by doing more math. Here are some recommended websites to aid in your efforts to support math fact automaticity at home.

www.Mobymax.com/co990
www.apples4theteacher.com/math/
www.coolmath-games.com/1-number-games

Another great idea is to search the many free math-fact phone apps. Having students practice on your phone will allow students to practice in the grocery store or in the car. Your children will never be bored in the car again. Math facts are practiced in class, but your child's continued practice at home will increase your child's success in math! Thank you for your support at home in helping our students become expert mathematicians.

Basic Skills Versus Conceptual Understanding

A Bogus Dichotomy in Mathematics Education

H. Wu, AMERICAN EDUCATOR/AMERICAN FEDERATION OF TEACHERS

EDUCATION SEEMS to be plagued by false dichotomies. Until recently, when research and common sense gained the upper hand, the debate over how to teach beginning reading was characterized by many as "phonics vs. meaning." It turns out that, rather than a dichotomy, there is an inseparable connection between decoding—what one might call the skills part of reading—and comprehension. Fluent decoding, which for most children is best ensured by the direct and systematic teaching of phonics and lots of practice reading, is an indispensable condition of comprehension.

"Facts vs. higher order thinking" is another example of a false choice that we often encounter these days, as if thinking of any sort—high or low—could exist outside of content knowledge. In mathematics education, this debate takes the form of "basic skills or conceptual understanding." This bogus dichotomy would seem to arise from a common misconception of mathematics held by a segment of the public and the education community: that the demand for precision and fluency in the execution of basic skills in school mathematics runs counter to the acquisition of conceptual understanding. The truth is that in mathematics, skills and understanding are completely intertwined. In most cases, the precision and fluency in the execution of the skills are the requisite vehicles to convey the conceptual understanding. There is not "conceptual understanding" and "problem-solving skill" on the one hand and "basic skills" on the other. Nor can one acquire the former without the latter.

It has been said that had Einstein been born at the time of the Stone Age, his genius might have enabled him to invent basic arithmetic but probably not much else. However, because he was born at the end of the 19th century—with all the techniques of advanced physics at his disposal—he created the theory of relativity. And so it is with mathematics. Conceptual advances are invariably built on the bedrock of technique. Without the quadratic formula, for example, the theoretical development of polynomial equations and hence of algebra as a whole would have been very different. The ability to sum a geometric series, something routinely taught in Algebra II, is ultimately responsible for

the theory of power series, which lurks inside every calculator. And so on.

The analogue of the same phenomenon in the artistic domain is even more transparent. A violinist who still worries about fingering positions cannot hope to impress with the beauty of tone or the elegance of phrasing, and an opera singer without the requisite high notes would try in vain to stir our souls with searing passion. In good art as in good mathematics, technique and conception go hand in hand.

The desire to achieve understanding in a technical subject such as mathematics while minimizing the component of skills is a most human one. There are situations where efforts to this effect are called for and, indeed, brilliantly executed. One can think of the classics of Courant and Robbins (*What Is Mathematics?*)[1] and Hilbert and Cohn-Vossen (*Geometry and the Imagination*).[2] In the context of school mathematics, however, such a desire cannot be indulged without doing great harm to students' education. There are many reasons. Sometimes a simple skill is absolutely indispensable for the understanding of more sophisticated processes. For example, the familiar long division of one number by another provides the key ingredient to understanding why fractions are repeating decimals. Or, the fact that the arithmetic of ordinary fractions (adding, multiplying, reducing to lowest terms, etc.) develops the necessary pattern for understanding rational algebraic expressions. At other times, it is the *fluency* in executing a basic skill that is essential for further progress in the course of one's mathematics education. The automaticity in putting a skill to use frees up mental energy to focus on the more rigorous demands of a complicated problem. Such is the case with the need to know the multiplication table (for single-digit numbers) before attempting to tackle the standard multiplication algorithm, a fact we will demonstrate in due course. Finally, when a skill is bypassed in favor of a conceptual approach, the resulting conceptual understanding often is too superficial. This happens with almost all current attempts at facilitating the teaching of fractions.[3]

Let us illustrate the last statement with the example of the division of fractions. Recall the familiar method of "invert and multiply": $\frac{a}{b} \div \frac{c}{d} = \frac{d}{c} \times \frac{a}{b}$

Nowadays, "invert and multiply" has become almost synonymous with rote learning. Among recent attempts to inject conceptual understanding into this topic, the following approach is not untypical.[4]

> Rather than relying on algorithms, where memorization of rules is the focus, the Mathland approach relies heavily on active thinking. To solve problems such as ¼ ÷ ½, students need to be able to verbalize the question: How many halves are there in one-fourth? This kind of fluency enables students to use their own logical and visual think-ing skills to really know what the solution (½) means in relation to the problem. *How many halves are there in ¼? There is one-half of ½ in ¼.*

Many pictures go with the explanation because it is easy to represent one-half, one-fourth, etc., by squares. Three pages down (p. 132), the "invert and multiply" algorithm is introduced and students are urged to "see if the answers you get by using [the algorithm] match up with answers you got earlier this week.... Allow plenty of time to experiment with the standard algorithm, then ask [students] to choose one problem that they worked with both ways and write about how the two solution methods compare." The problems suggested for practice are all of the type $\frac{5}{6} \div 16$, $\frac{1}{2} \div \frac{1}{6}$, $3 \div \frac{1}{6}$, etc. With conceptual understanding thus restored—or so it seems—the mathematical exposition on the division of fractions comes to an end.

If only *simple* fractions such as those given above are involved, the preceding approach emphasizing the visual aspect of division is for the most part adequate. The worm in the apple is the need to deal with division problems when the fractions are not at all simple. For example, what do the above brand of logical and visual thinking skills have to say about $\frac{2}{97} \div \frac{31}{17}$? Nothing, of course. A natural consequence of such an approach is that children develop a sense of extreme insecurity upon the sight of any fraction other than the simplest possible.

It is good to start with simple fractions that children can visualize, and they should do many such problems, until they have a firm grasp of what they are doing when they divide fractions. But we should not make students feel that the only problems they can do are those they can visualize. We should explain to them that of course they cannot draw a picture of $\frac{2}{97} \div \frac{31}{17}$; it is doubtful that anyone can. But this does not mean they cannot do the problem! Or that more complex problems like this one are not essential.

An analogy to addition may be helpful. When children were first learning to add, perhaps they counted out three blocks and then counted out four blocks and joined them to get seven blocks. But we didn't tell them that, when faced with the problem 1,272 + 846, their only choice was to gather up hundreds of blocks or draw hundreds of dots on their paper and count them. Nor did we tell them the problem was too difficult for them or not important. No, we told them there was a *mathematical* route to the answer. And not a "rote, meaningless" one, but a procedure based on simple but sound mathematical principles. And we *taught* it to them.

And so we can do with fractions. From the intuitive to the abstract, and from primitive skills to sophisticated ones, such is the normal progression in mathematics. The way to approach the division of non-simple fractions is not to bypass "invert and multiply," but to confront it.

We begin by asking what it means to say a fraction $\frac{x}{y}$ equals $\frac{a}{b} \div \frac{c}{d}$ and realize that perhaps we have not fully come to terms with the meaning of the division of whole numbers. Children are taught, for example, that 24÷3=8 means that if you "divide 24 objects into 3 equal portions, each portion would have 8 objects." However, such a grouping of the 24 objects shows that it is 8+8+8, which is therefore the same as 3x8. So in this case, "24÷3=8" means exactly that 24=3x8. This reasoning turns out to be general, in the sense that if we analyze any other example, say 80÷16=5, then repeating the preceding reasoning leads to a similar conclusion that it is the same as 80=5x16. Along this line, fifth-graders should have no trouble understanding that, in general, for whole numbers *m*, *n* and *k*, the statement

$$m \quad n=k$$

says exactly the same thing as

$$m=n \times k.$$

This then provides an abstract point of view to understand division in terms of multiplication. It is common to express this interpretation of division as "division is the inverse operation of multiplication."

With the new insight at hand, we can now reprise the division of fractions: To the extent that whole numbers and fractions are just "numbers," they must share the same properties in terms of the basic operations such as multiplication or division. Thus looking at each fraction as a number and imitating the case of whole numbers, we see that the division $\frac{a}{b} \div \frac{c}{d} = \frac{x}{y}$ ought to mean $\frac{a}{b} = \frac{c}{d} \times \frac{x}{y}$. This is then how we want to *define* the division of fractions. Multiplying both sides by $\frac{d}{c}$ immediately leads to $\frac{x}{y} = \frac{d}{c} \times \frac{a}{b}$.

In other words, $\frac{a}{b} \div \frac{c}{d} = \frac{d}{c} \times \frac{a}{b}$.

Thus the method of "invert and multiply" is a result of a deeper understanding of fractions than that embodied in the naive logical and visual thinking skills above. We see clearly the concordance of skills and understanding in this instance.

There is at present a desire in a large segment of the education community to achieve understanding of fractions—the bugbear of elementary mathematics education—by avoiding the traditional skills and by restricting attention only to very simple fractions and a naive visual reasoning of the type described above. While the intention is laudable, the inevitable net result is that skills and understanding both are given short shrift. The following passage is another example that sets forth such an agenda:[5]

We should not make students feel that the only problems they can do are those they can visualize.

> The mastery of a small number of basic facts with common fractions (e.g., ¼ + ¼ = ½; ¾ + ½ = 1¼ and ½ x ½ = ¼)... contributes to students' readiness to learn estimation and for concept development and problem solving. This proficiency in the addition, subtraction, and multiplication of fractions and mixed numbers should be limited to those with simple denominators that can be visualized concretely and pictorially and are apt to occur in real-world settings; such computation promotes conceptual understanding of the operations. This is not to suggest however that valuable time should be devoted to exercises like 17/24 + 5/18 or 5¾ x 4¼, which are much harder to visualize and unlikely to occur in real-life situations. Division of fractions should be approached conceptually.

Without going into details (which are not unlike those related to the division of fractions), it is again the case that if students only have enough understanding of fractions to do simple operations such as 1/4 + 1/4, 3/4 + 1/2, 1/2 x 1/2, etc., but nothing else, then this understanding is fragile and defective. In this context, it may be worthwhile to point out, in a different way, how the good intention of promoting understanding by suppressing skills can ultimately diminish students' understanding. Both examples of computations, 17/24 + 5 /18 and 5¾ x 4¼, which students are advised to avoid, are in fact extremely simple to perform. For example, if students have a firm grasp of the distributive law, then: $5\frac{3}{4} \times 4\frac{1}{4} = (5+\frac{3}{4}) \times (4+\frac{1}{4}) = (5 \times 4)+(5 \times \frac{1}{4})+(\frac{3}{4} \times 4)+(\frac{3}{4} \times \frac{1}{4})$.
Because the resulting multiplications and additions on the right are easy to do by any standard, the original computation is also accomplished therewith. The exhortation not to do this computation—although well-intentioned—ends up slighting a very important weapon in students' conceptual arsenal: the distributive law.
There is yet another reason why division of fractions should not be limited to only those problems that students can visualize, which is apparently what the passage quoted above means when it says "approached conceptually." If students are not fed a steady diet of increasing abstraction, how can they hope to cope with algebra a year or two later? The "algebra for all" battle cry will be an empty promise unless it is backed up by an insistence on elevating education in grades 5 to 7 to periodic heights of abstraction.

LET US now take up the issue of the teaching of the standard algorithms in elementary school, where the confrontation of skills vs. understanding is most intense. We are told that these algorithms are by their very nature nothing more than rote, meaningless mathematical maneuvers.

Indeed, the very mention of the teaching of standard algorithms causes open hostility in some mathematics education circles. In a recent article, the president of the southern section of the California Mathematics Council put forth the view that the explicit presence of algorithms in the new California Mathematics Standards is nothing less than an advocacy for knowledge to be taken "as a collection of bits or facts to be learned by memorization and impressed upon the child from the outside," which then results in children trying to "mechanically memorize meaningless facts and skills."[6]

This view echoes one that is held by many educators, among them Constance Kamii. Kamii is generally acknowledged to be a leading advocate of this point of view. A much quoted recent article co-authored by Kamii and Ann Dominick is provocatively entitled "The Harmful Effects of Algorithms in Grades 1-4."[7] Its main thesis is this:

> Algorithms not only are not helpful in learning arithmetic, but also hinder children's development of numerical reasoning.
>
> We have two reasons for saying that algorithms are harmful: (1) They encourage children to give up their own thinking, and (2) they "unteach" place value, thereby preventing children from developing number sense....
>
> The persisting difficulty [with standard algorithms] lay in the column-by-column, single-digit approach that prevents children from thinking about multidigit numbers.

This then brings us to an impasse, according to Kamii and Dominick: Children can have conceptual understanding of numbers without learning algorithms, or they become mathematical error-prone robots. Which do we prefer? Invoking Piaget's constructivism [sic], Kamii and Dominick recommend that

> Children in the primary grades should be able to invent their own arithmetic without the instruction they are now receiving from textbooks and workbooks.

We are thus led to believe that there is no way to teach a simple addition such as 89 + 34 (a problem Kamii and Dominick consider) using the standard algorithm except by ramming it down children's throats. Could these authors be unaware of the fact that the addition algorithm, like all other standard algorithms, contains mathematical reasoning that would ultimately enhance children's un-derstanding of our decimal number system? Why not consider the alternative approach of teaching these algorithms properly before advocating their banishment from classrooms? Let us see what we can do with the addition algorithm in the special case of 89 + 34.

In a third-grade class, say, let us assume that the children already know how to add single-digit numbers fluently. To teach them the addition of 89 to 34, one may begin with a simpler problem: 59 + 34. This is because 59 + 34 would avoid any mention of the hundreds digit. Now, one must emphasize at all times that 59 is 50 + 9 and 34 is 30 + 4. So 59 + 34 can be added separately in this way:

$$\begin{array}{rcrl} 50 & + & 9 & \\ 30 & + & 4 & (+ \\ \hline 80 & + & 13 & \end{array} \qquad (1)$$

Because each "vertical" addition involves only single digits, the individual steps should offer no difficulty to children. Now add 13 to 80 to get 93; again this should present no difficulty, because the children can repeat the above process if necessary:

$$\begin{array}{rcrl} 80 & & & \\ 10 & + & 3 & (+ \\ \hline 90 & + & 3 & \end{array} \qquad (2)$$

Give several such problems to allow the children to practice addition in this long-winded manner. Because they understand this simple skill, such extended practice to perfect the skill is both necessary and *desirable*.

After the students have become thoroughly familiar with the method, point out to them that what they have been doing each time is to add the ones digits *separately*, and then the tens digits *separately*: 9 + 4 and 5 + 3 in step (1), and 8 + 1 and 0 + 3 in step (2). Let them do a few more such additions and take note of this fact each time. Allow some time for this idea to sink in before introducing them to the first simplification: Build-ing on the newly acquired idea of adding the digits in different "places" separately, point out to them that they could save some writing in step (2) because they can simply line up the ones and tens digits vertically and directly add since the ones digit in 80 would always be 0:

$$\begin{array}{r} 80 \\ 13 \quad (+ \\ \hline 93 \end{array} \qquad (3)$$

Again give the students time to get used to this idea. Make them do many practice problems of this type: 40+ 12, 60 + 18, etc.

Children welcome any suggestions that save labor. It is therefore time to introduce another one. When they can do step (2) in the format of step (3) *fluently*, tell them that in fact they could combine steps (1) and (2) into one step by bringing down the "13" to the next line and add as in step (3):

$$\begin{array}{rcrr} 50 & + & 9 & \\ 30 & + & 4 & (+ \\ \hline 80 & + & 13 & \\ 13 & & & (+ \\ \hline \mathbf{93} & & & \end{array}$$

With a little bit more practice, the children can simplify the writing even further:

$$\begin{array}{lcr} & & 59 \\ & & 34 \quad (+ \\ \hline (50 + 30) & \Rightarrow & 80 \\ \\ (9 + 4) & \Rightarrow & 13 \quad (+ \\ \hline & & 93 \end{array}$$

(Students need not write down the two lefthand columns consisting of [50 + 30], [9 + 4], and the long right arrows; these only serve as instructional reminders.) The final *coup de grâce*, to be administered only when the children are already secure in all the preceding simpler addition activities, is to point out a *shorthand method* of writing the preceding step: Slip the tens digit "1" of the "13" under 34 to keep track of the addition of the ones digit. So:

$$\begin{array}{r} 59 \\ 34 \\ {\scriptstyle 1} \quad (+ \\ \hline 93 \end{array}$$

This then is the standard addition algorithm. It should be plain to the children (even if they may not be able to articulate it) that this is an efficient compression of a valuable piece of *mathematical reasoning* into a compact shorthand. They would appreciate this efficiency, let it be noted, only if they have meticulously gone through the laborious process of steps (1) to (3) above. Because young minds are flexible and discerning, the children will learn the algorithm logically without being pressured "from the outside" to "mechanically memorize meaningless facts and skills" while "giving up their own thinking." On the contrary, they will learn how to reason effectively, and the whole experience will stand them in good stead in their later work.

The next step is of course to go back to the original problem of 89 + 34, but the introduction of the hundreds digit in 80 + 30 should now present no real difficulty since the simpler case has been firmly mastered.

It may be useful to elaborate on the idea that the standard algorithm presented above captures a valuable piece of mathematical reasoning that enhances students' understanding of numbers. We can see this more clearly by making explicit the underlying mathematics. The fact that 59 + 34 can be added as in step (1) makes implicit use of the commutative law and as-sociative law of addition:

$$
\begin{aligned}
59 + 34 &= (50 + 9) + (30 + 4) \\
&= [(50 + 9) + 30] + 4 \quad \text{(assoc. law)} \\
&= [(50 + 9) + 30] + 4 \quad \text{(assoc. law)} \\
&= [(50 + 9) + 30] + 4 \quad \text{(comm. law)} \\
&= [(50 + 30) + 9] + 4 \quad \text{(assoc. law)} \\
&= (50 + 30) + (9 + 4) \quad \text{(assoc. law)}
\end{aligned}
$$

Without entering into the tedious details, one need only point out that both laws are also used in all subsequent arguments. Third-graders should not be saddled with this kind of formalism, of course, but teachers should be aware of it if only to gain the confidence that teaching the standard algorithm does not "encourage children to give up their own thinking." Teachers will also need this knowledge to explain it to their students should the need arise.

Children always respond to reason when it is carefully explained to them. The day will come when teachers are capable of explaining these time-honored algorithms in this logical manner. In the meantime, let us be constructive and concentrate on the needed professional development of teachers rather than spread the destructive theory about the harm these algorithms inflict upon children.

To drive home the point that the standard algorithms embody conceptual understanding, let us conclude with an examination of the multiplication algorithm as taught to, say, fourth-graders. *We assume they are fluent in single-digit multiplications.* Consider the problem of 268 x 43. A new element now appears in the form of the distributive law. Because this law is so basic and because fourth-graders are sufficiently

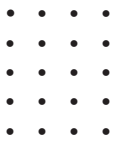
mature to understand it, the law should be explained to them: For any number a, b, c:

$$a(b + c) = ab + ac.$$

Henceforth, we will write $a \times b$ as ab for simplicity. Because multiplication is commutative, this also implies:

$$(b + c)a = ba + ca.$$

This law can be made plausible using rectangular arrays of dots. For example, 5 x 4 is represented by a five-row and four-column collection of dots.



Similarly 5 x 3 is represented by the dots in:

Hence (5 x 4) + (5 x 3) is represented by the dots obtained from putting the two sets of dots side by side:

But this is a rectangular array of dots with 5 rows and (4 + 3) columns, so it represents 5 x (4 + 3), thereby verifying the distributive law in this special case. The general case is entirely similar.

In the following, we shall call attention to the dis-tributive law each time it is used, but will use the commutative laws and associative laws without mention. To compute 268 x 43, we shall *appeal to the higher order thinking skill of breaking complicated tasks down to simple ones* by breaking it down to two simpler multiplication problems. Because 3 and 4 are the two digits of 43, we first compute 268 x 3 and 268 x 4 separately. Because 268 = 200 + 60 + 8 (as usual, students need to be reminded of this fact), the distributive law gives:

$$268 \times 3 = (3 \times 200) + (3 \times 60)\ \ (3 \times 8).\ 8).$$

Because students know how to multiply single-digit numbers, this equals

$$268 \times 3 = 600 + (180) + (24). \tag{4}$$

Because the 180 above comes from the tens digit, we can "split off" the 100 from 180 = 100 + 80 and combine it with 600:

$$268 \times 3 = (600 + 100) + (80) + (24). \quad (5)$$

Similarly, 24 = 20 + 4, and we can combine the 20 with the 80 in the tens digit:

$$268 \times 3 = (600 + 100) + (80 + 20) + 4. \quad (6)$$

But now the (80 + 20) in the tens digit is equal to 100, and we can again combine it with the (600 + 100) in the hundreds digit. Thus

$$268 \times 3 = (600 + 100 + 100) + 0 + 4 = 800 + 0 + 4 = 804.$$

A few more experiences with working from left to right would tell us that we are likely to waste a little time by so doing because of the frequent need to backtrack to fix a certain digit as in step (6). (There it was the tens digit.) Thus *from experience,* we learn *to work from right to left in order to save time.* This is the reason to work from right to left, but let students find out for themselves by working through several such problems. Therefore, we now redo the above, from right to left, as follows. Start with step (4) again, 24 = 20 + 4, so

$$268 \times 3 = 600 + (180) + (20 + 4) = 600 + (180 + 20) + 4. \quad (7)$$

Next, 180 + 20 = 200, which can be combined with 600:

$$268 \times 3 = (600 + 200) + 0 + 4 = 800 + 0 + 4 = 804. \quad (8)$$

The numbers that were carried from the ones digit to the tens digit in step (7) and from the tens digit to the hundreds digit in step (8) can be recorded by a short-hand method, and this is the standard algorithm for the multiplication of any number by a single-digit number:

$$\begin{array}{r} 268 \\ \times\quad 3 \\ \hline 804 \end{array}$$

(carries: 2 2)

In exactly, the same way, we see that 268 x 4 = 1,072 via the standard algorithm:

$$\begin{array}{r} 268 \\ \times\quad 4 \\ \hline 1{,}072 \end{array}$$

(carries: 2 3)

Incidentally, this implies that:

$$268 \times 40 = 10{,}720. \quad (9)$$

Now we put the pieces together using the distributive law:

$$268 \times 43 = 268 \times (40 + 3) = (268 \times 40) + (268 \times 3).$$

Using steps (8) and (9), we obtain:

$$268 \times 43 = 10{,}720 + 804 = 11{,}524.$$

In retrospect, we see that the single-digit approach to this two-digit multiplication problem (that of multiplying by 43) results from *heeding the call of the indispensable mathematical principle to always break down a complicated problem into simple components.* The *correct* way to think about multi-digit multiplication is therefore to regard it as nothing more than a sequence of single-digit multiplications. Let children learn this fundamental fact from day one.

Now to convert the preceding to algorithmic form, it is traditional to use the commutative law of addition to rewrite it as:

$$268 \times 43 = 804 + 10{,}720 = 11{,}524$$

so that we have:

$$\begin{array}{r} 268 \\ 43 \quad (\times \\ \hline 804 \\ 10720 \quad (+ \\ \hline 11524 \end{array} \qquad (10)$$

A final touch-up: We see from step (9) that the "0" at the end of 10,720 comes from the "0" of 40, and is the result of 268 being multiplied by the tens digit (4 in this case). Thus this "0" can be taken for granted and will therefore be omitted in the next-to-bottom row of step (10). This accounts for the apparent shift of digits in the next-to-bottom row of the *standard multiplication algorithm:*

$$\begin{array}{r} 268 \\ 43 \quad (\times \\ \hline\hline 804 \\ 1072 \quad (+ \\ \hline 11524 \end{array} \qquad (11)$$

Several observations readily come to mind at this point. The foremost pertains to the clear demonstration of the unity of skills and under-standing in this derivation. For example, fluency with single-digit multiplication allows us to take for granted 268×40 and 268×3 and focus instead on the mathematical ideas leading up to step (10). Another observation is to underscore yet again the central role played by the distributive law, while noting (of course) that the commutative law and associative law also have been used implicitly. For example, in going from step (4) to step (5), we have used the associative law of addition because: $600 + 180 = 600 + (100 + 80) = (600 + 100) + 80$. A third observation is that this derivation is nothing if not about place value. The passage from (10) to (11), for example, explains in terms of place value why the digits of the middle two rows have that particular vertical alignment. In what way then does learning the standard algorithms "unteach" place value?

Finally, we call attention to the breathtaking simplicity of the multiplication algorithm itself despite the tediousness of its derivation. The conceptual understanding hidden in the algorithm is the kind that students eventually need in order to prepare for algebra. In short, this algorithm is a shining example of elementary mathematics at its finest and is fully deserving to be learned by every student. If there is any so-called harmful effect in learning the algorithms, it could only be because they are not taught properly. In Chapter 2 of her pathbreaking book, *Knowing and Teaching Elementary Mathematics*,[8] Liping Ma gives a more refined discussion of why rote learning might take place in the context of multi-digit multiplication: It does so when the teacher does not possess a deep enough understanding of the underlying mathematics to explain it well. The problem of rote learning then lies with inadequate professional development and not with the algorithm. This is exactly the kind of scholarship we need in order to assist our teachers and to move mathematics education forward.

We have given several examples to show that deep understanding of mathematics ultimately lies within the skills. It remains to make a passing comment on the idea of skipping the standard algorithms by asking children to invent their own algorithms instead. The justification is that inventing algorithms promotes conceptual understanding. What is left unsaid is that when a child makes up an algorithm, the act raises two immediate concerns: One is whether the algorithm is correct, and the other is whether it is applicable under all circumstances. In short: correctness and generality. In a class of, say, 30 students, asking the teacher to carefully check 30 new algorithms periodically is a Herculean task. More likely than not, some incorrect algorithms would slip through, and these children would come out of this encounter with mathematics with no understanding at all. Such a potentially harmful effect should have been brought into the open in the advocacy of invented algorithms, but it seems not to have been done. As far as generality is concerned, this aspect of the standard algorithms—the fact that they are applicable under *all* circumstances—seems also to have been neglected in educational dis-cussions. For example, although there are shortcuts to compute special products such as 97 x 103 faster than the standard algorithm, these shortcuts would be of no help at all in a different setting. With each invented algorithm, then, the responsibility of checking its generality again falls on the teacher. Are those who are telling teachers to encourage invented algorithms in their classrooms aware of this heavy burden?

As Euclid told King Ptolemy in the fourth century, B.C., there is no royal road to geometry. Neither is there a royal road to conceptual understanding. Let us teach our children mathematics the honest way by teaching both skills and understanding.

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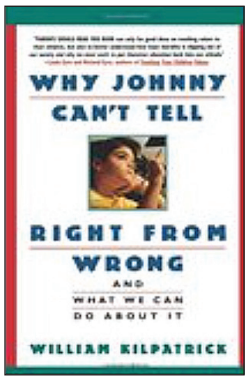
Character Education in the Discipline Process

Torgun Lovely, LCHS Principal

Kids make mistakes. When juvenile mistakes occur here at Liberty, we view them as valuable learning opportunities—occasions for lovingly asserting our character-education objectives when they are most in need.

As a longtime educator, I am convinced the approaches we have developed over the years are among the best I have ever encountered, mainly because they give students the greatest chance to truly learn from their mistakes. We assist them in developing a moral compass pointing toward the good life.

In one of Liberty's founding books, *Why Johnny Can't Tell Right from Wrong*, author **William Kilpatrick** described several flaws in the modern-day approach to teaching students "decision-making skills" in lieu of teaching character education. Of one common flaw, Kilpatrick wrote:



Finally, it [the shift away from character education] has helped create an educational system with a de facto policy of withholding from children the greatest incentive to moral behavior—namely, the conviction that life makes sense—a policy of doing everything possible to prevent them from learning the larger purposes or stories that give meaning to existence. In failing to impart these stories, schools have deprived children of both moral context and moral energy.

We have intentionally built our discipline process around the explicit idea that children can shape and strengthen their character upon making mistakes. A perfect time to learn moral lessons is while a student is young and still morally pliable.

At Liberty, our disciplinary process entails a handful of commonsense tactics with the goal of eventually discussing our Capstone virtues at a scholarly level within the context of a student's story. At the onset of our disciplinary intervention, students are engaged in a dialogue with an administrator to ensure they are well aware of why their mistake was wrong.

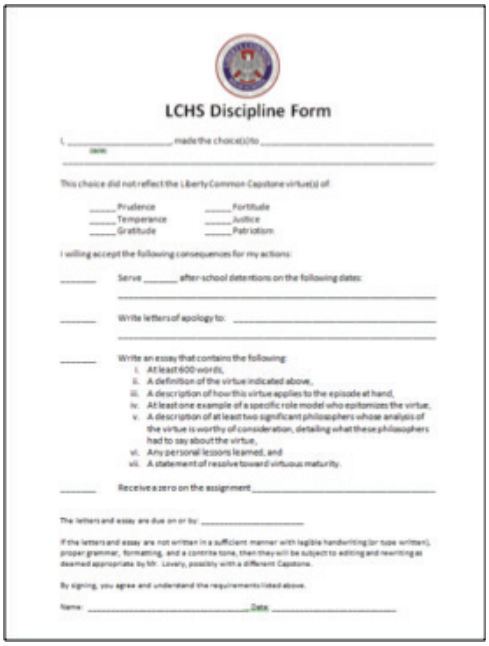
We want to verify the student has a clear understanding of how their errant behavior affects those involved (themselves, their instructors, other students, and the school in

general). From there, the discussion is directed toward effectively reconciling an offense against other persons.

Students are brought to see that an apology needs to be forthcoming to all affected parties, especially their parents. Students are coached on how to formulate and articulate a full and proper apology. This includes a brief acknowledgment of the offense, a statement of regret to show understanding and remorse for how the incident caused harm to others, a commitment to avoid such an offense in the future, and an unambiguous request for forgiveness.

Students write apology letters and deliver them in conjunction with redundant verbal apologies to recipients. Learning to make a full and proper apology is a valuable life skill beneficial well beyond a school setting, and is an act of justice too rare in modern-day society.

At some point in the conversation, students are asked which of the school's Capstone virtues were most obviously betrayed during the time of the infraction. Students are then assigned a "Capstone research project" focused on the virtue they identify (prudence, temperance, justice, fortitude, patriotism, or gratitude).



LCHS Discipline Form

I, _____ made the choice(s) to _____

date

_____

This choice did not reflect the Liberty Common Capstone virtue(s) of:

_____Prudence _____Fortitude
_____Temperance _____Justice
_____Gratitude _____Patriotism

I willing accept the following consequences for my actions:

_____ Serve _____ after-school detentions on the following dates:

_____

_____ Write letters of apology to: _____

_____

_____ Write an essay that contains the following:

i. At least 900 words;
ii. A definition of the virtue indicated above;
iii. A description of how this virtue applies to the episode at hand;
iv. At least one example of a specific role model who epitomizes the virtue;
v. A description of at least two significant philosophers whose analysis of the virtue is worthy of consideration, detailing what these philosophers had to say about the virtue;
vi. Any personal lessons learned; and
vii. A statement of resolve toward virtuous maturity.

_____ Receive a zero on the assignment _____

The letters and essay are due on or by: _____

If the letters and essay are not written in a sufficient manner with legible handwriting (or type written), proper grammar, formatting, and a contrite tone, then they will be subject to editing and rewriting as deemed appropriate by Mr. Lovely, possibly with a different Capstone.

By signing, you agree and understand the requirements listed above.

Name: _____ Date _____

This exercise has proven to be one of the more unique and ultimately successful tactics employed at Liberty. Students are assigned either a written paper or a verbal presentation with an administrator. The project involves researching the identified Capstone virtue in order to:

1. **Give a definition** of the virtue,
2. **Detail how that virtue applies** to the episode at hand,
3. **Describe a role model** in their lives to whom they can look as an example,
4. **Describe two philosophers** whose analysis of the virtue is worthy of consideration, summarizing a few main points the philosophers have contributed to our modern understanding of the virtue,
5. **Describe any personal lessons learned;** and,
6. **Make a statement of resolve** toward virtuous maturity in the future.

Students who complete these projects typically end up feeling empowered. They enjoy new confidence in their ability to make better choices by further internalizing powerful classical virtues. This is especially true when the projects are completed with the guidance of their parents.

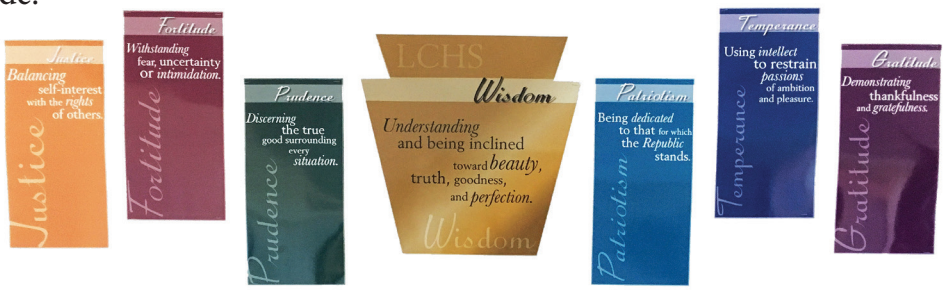
The follow-up conversations with school administrators are particularly powerful and uplifting. Students are enabled to articulate an impressive amount of knowledge regarding classical philosophical ideas. They have an opportunity to apologize for their actions and solemnly reflect on the consequences incurred by all involved.

They find peace and closure upon knowing directly that others have forgiven them. Often, an enormous burden is lifted, replaced by a sense of personal growth and encouragement.

This process has been particularly impactful in cases of cheating or plagiarism—the most common serious disciplinary offense we deal with at Liberty. Kids are typically unaware of how detrimental academic dishonesty is to an instructor, and how cheating or plagiarizing directly undermines a teacher's job.

When a student comes to understand an instructor's professional responsibility for delivering both content and assessing student comprehension, the student gains a deeper appreciation of why his or her actions are so offensive to an educator, to the school, and to the community. The student is also led to understand how academic dishonesty is incredibly damaging to oneself.

The student learns how reliance upon cheating and plagiarism inevitably leads to harmful adult habits and dire consequences if unaddressed. Discussions about the widespread epidemic of cheating in other schools, on college campuses, in business, and in life are helpful to students, especially when framed by the cardinal virtues of prudence, temperance, justice, and fortitude.



Liberty's Capstone virtues are not merely words displayed on posters in each of our classrooms. They are the essential components in seeking the good life.

All Liberty students are expected to understand and to be inclined toward beauty, truth, goodness, and perfection—the essence of wisdom. When they fall short, typically through the commission of some juvenile error, our school capitalizes on a ripe opportunity to reinforce lessons that ought to last a lifetime.

We purposefully encourage all students to avoid all matters warranting disciplinary action at school. Nonetheless, when students do make mistakes, we feel fortunate they make them at Liberty Common School.

Students finding themselves in these situations usually agree.

For additional information, please see the Liberty Common Policy Manual or Student-Parent Handbook.

Students Unplugged

Jeff Siener, LCS Teacher

Over the course of nearly 20 years teaching at Liberty, I have seen many changes. Testing on computers, the explosion of the Internet, and using email as the primary source of communication with families name just a few. Yet some aspects of the field of education have remained very constant. I have observed a common thread in many of the students who have thrived, not only academically, but also socially, and thereby become better prepared for college and the working world. Interestingly, this commonality is not something taught at school. It is an action and philosophy from their home lives. Many of the most successful and driven students I have had the privilege of working with and watching pass through the halls of our school have been brought up in an environment with limited screen time and exposure to video games and other gaming devices.

For most children and young adults, electronics have addictive qualities. Their high levels of visual stimulation and immediate feedback cause many "plugged-in" students to become less engaged with daily tasks at home and at school.

There are many studies and articles circulating about the pros and cons of video games in relation to reaction time and problem solving abilities. Additionally, I have used my own unofficial study group over nearly two decades, my students. The negative implications for students who regularly play video games and excessively watch television far outweigh the benefits.

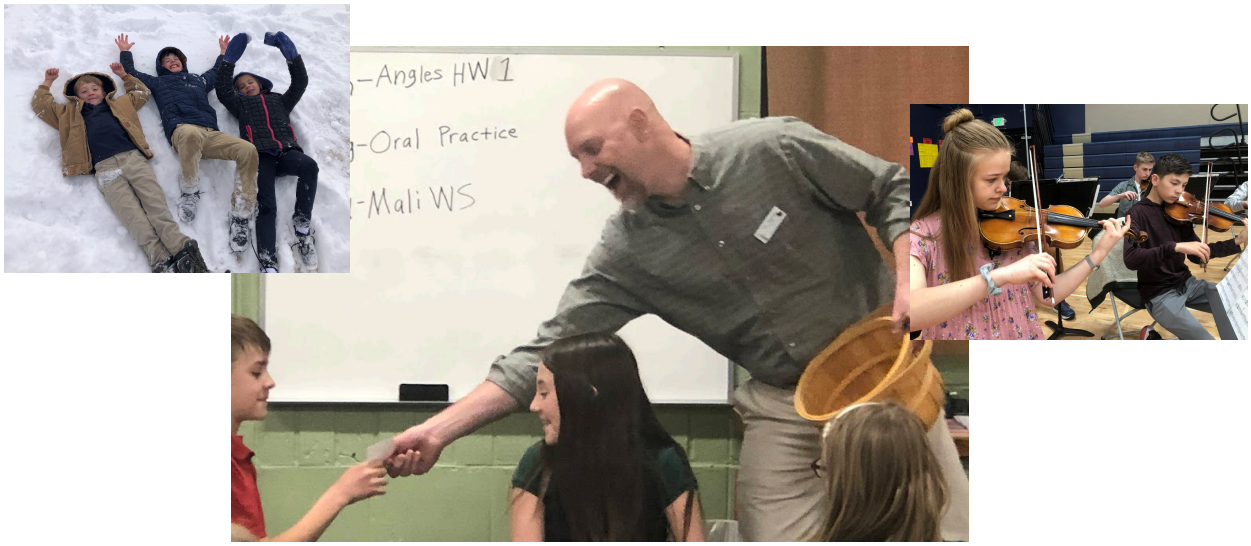
On and off over the last 10 years, I have given a challenge to my students. At the beginning of second semester, I challenge them to completely refrain from watching TV, movies, and playing video games at home, even on the weekends and during breaks from school. The results of this challenge are *always* the same. Many students are unable to hold out beyond the initial five day school week. For the motivated students who push through the first two weeks, there is a noticeable transformation. At home, they spend more time outside, reading, and playing with siblings. At school, I find the students are better rested, more focused on tasks, have better class participation, and display improved work quality. The students that persevere beyond one month begin to develop new habits and take on new hobbies or sports. They seem to be physically healthier because their attendance at school improves. The most profound change for every student that pushes beyond one month is the immense growth in his or her reading skills.

In the 21st century, it is very difficult, and unrealistic, for all of us to completely "unplug," especially when so much of our daily lives are conducted through these convenient, yet

addictive, devices. Below are several small steps that can have a huge impact for reducing distracting screen time and improving long term success.

- **Avoid movie-sitters.** Keep a stack of books in a bag to take with you when you go somewhere that may involve sitting and waiting. Save movies in the car for road trips if watched at all. Audiobooks always make a great alternative.
- **Do not put a television or computer** in a child's bedroom at any age.
- **Avoid getting children their own cell phones,** tablets, or computers as long as possible. Base the timing on family needs, not social pressures or a begging child. Having an extra "family" phone is a possible solution.
- **Avoid screen time from Sunday evening until Friday afternoon** unless it is school related, such as studying, practicing skills, or doing research.
- **Avoid cell phones or tablets in the bedroom** at least one hour before bedtime. Many studies have shown how detrimental the use of electronic devices before bed is to sleep quality and duration.
- **When your children's friends come to your home to visit,** help them develop healthy social skills by asking them to leave their electronic devices in a basket by the door.

We live in an amazing time with so many great tools and a vast amount of information at our fingertips. As parents and educators, it will be a continuous endeavor to balance the use of such tools and devices while setting reasonable and realistic boundaries for our children.



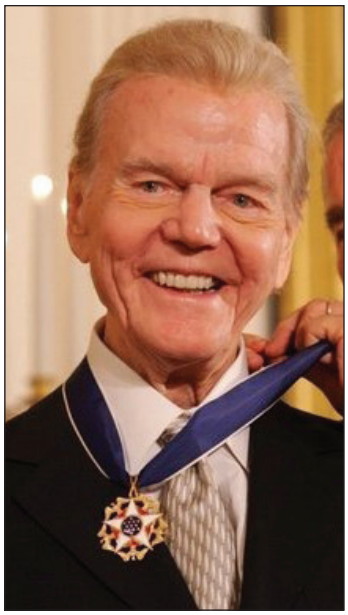
Liberty's Dress Code: The Rest of the Story

Bob Schaffer, Headmaster

One attractive feature of Liberty Common School is the school's Dress Code. It's an apposite balance struck between school uniforms that are often associated with private institutions and wide-open and unrestricted approaches often associated with large urban campuses.

And now you're about to hear…the rest of the story:

"You're starting to sound as casual as you dress," said **Bob Benninghoff,** longtime engineer for the famous radio feature *Paul Harvey News and Comment.* The target of the sharp remark was none other than the radio master himself, **Paul Harvey**.



Paul Harvey

Harvey once described for his worldwide audience how he briefly succumbed to the trend toward casual office attire. After all, Harvey was admired because of his commentary, storytelling and news reporting—delivered entirely over the radio.

Since listeners could not see how he was dressed, Harvey found himself opting for the comfort of open collars, khakis and shirtsleeves at work. His appearance, he reasoned, should not have been a factor in his daily performance.

Yet it was.

Benninghoff perceived that he could hear a more casual tone in the doyen's radio delivery, and it turned out he was not alone in sharing this opinion directly with Harvey. Others, too, had noticed a difference in Harvey's radio performances. (An excerpt on this story can be found in the book *Paul Harvey's America* by **Stephen Mansfield** and **David Holland**).

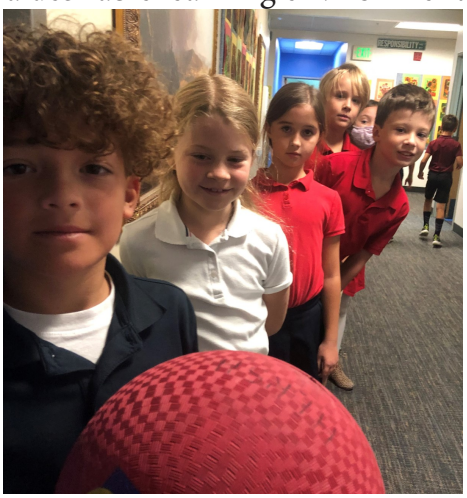
Harvey quickly realized his apparel affected his attitude. His attitude affected his performance. His performance affected the millions of listeners who tuned in every day to hear Harvey.

The more casual his clothing, the more casually he approached his craft. If he wanted to do his level best, he now knew he needed to resume dressing his best.

For Harvey, it was back to crisp shirts, pressed jackets and smart ties; and, back to the soaring ratings that placed him at the pinnacle of achievement in radio-broadcasting history.

As a charter school aspiring to reach the pinnacle of achievement in public-education history, Liberty's school policy promotes decent attire in order to foster a staid learning environment.

A respectable dress code has been part of Liberty's culture since the school's doors were first opened in 1997. The school's original charter notes "a dress code would help establish a desirable learning environment."



According to Liberty's teachers, there is a palpable relationship between the school's dress code and learning. For example, students behave quite differently when we reward them with "Free-Dress Days," and "Liberty T-shirt Days." Dressing down has a direct undesirable impact on attitudes in school.

The Liberty Dress Code has a positive impact on how students treat one another, how well they show respect for their teachers, their punctuality, and how well they're maintaining a focus on academic goals. Liberty cannot afford to get off track in these matters.

The administration and faculty at Liberty endeavor to enforce the school's Dress Code, tardiness and gum chewing in school. Students are reminded of their obligations in this regard at the beginning of each school year. All parents, too, are alerted to these expectations at parent meetings, in the Student/Parent Handbook, and in other school publications.

Liberty is fortunate to have a balanced Dress Code and rational disciplinary expectations. These clear guidelines minimize disruptions, and help mask social distinctions indicated by attire. They convey a sense of dignity and mutual respect; and, they help families save money when buying school clothing.

Moreover, Liberty's modest Dress Code strategy promotes the school's theme of Common knowledge, common virtues and common sense.

And now you know, as Paul Harvey used to say, "…the rest of the story. Good day!"

Our Unique Junior-High Order System

Tricia Diehl, Liberty parent & Board Member

One of the many reasons I love having my kids in a smaller school is the richness of experiences they are offered. We have an impressive school history, and all of us can share the proud academic accomplishments of our current and past students. What about their social development?

I am continually impressed by the creative and meaningful ways the staff and kids transition through the school year. Our school allows students to get to know each other, have fun, and develop leadership skills at the same time.

Liberty's unique strategy to assist our kids in their social, moral and leadership development is through our seventh-grade and eighth-grade Order System.

At the beginning of each school year, incoming seventh graders are placed in an "Order" of approximately fifteen other seventh graders. They remain in the same Order with the same students and the same supervising teacher for two years.

The Orders are named after fictional locations referred to in the Core Knowledge Literature Sequence, including a mascot that is associated with that location.

Order of Atlantis ---- *The Krakens*
Order of Camelot ---- *The Knights & Ladies*
Order of Delphi ---- *The Pythons*
Order of Elysium ---- *The Warriors*
Order of Erebor ---- *The Dragons*
Order of Valhalla ---- *The Vikings*

The Orders meet regularly during school with their Order advisors to plan dances, raise money for charities, plan fun intra-Order activities, organize friendly competitions with other Orders, ask advice, and bond with other students and faculty in a small, orderly environment.

Each Order establishes a student leadership structure. Orders choose their own leaders who then meet regularly with other Order leaders. They learn to create a meeting agenda and stick to it. They learn to raise and manage money and how to set spending priorities.

Through the Order System students learn to participate in meetings, work in committees, plan and host events, speak in public, and interact with adults, as well as how to be held accountable.

These kids work extraordinarily hard, and it is important for them to have opportunities to relax and enjoy time together. The Order system gives our seventh and eighth graders a unique opportunity to combine competition, community service, leadership, and social experiences to enrich their junior high years at Liberty Common School.

The Order system leads nicely into the high school's House System where student leadership skills are further developed. Through the House System, the older high school students serve as role models to younger students so they can learn the virtues and character expected at Liberty Common School.

It is always fascinating, sometimes even magical, watching our children become young adults. Liberty's Order system helps our kids get the best and the most out of their junior high years.

Why We Teach Social Dance

Bob Schaffer, Headmaster

Liberty's social-dance course reinforces our philosophy toward a high-quality, classical, liberal-arts education. We first offered the class in 2013, and it has become a permanent part of the school's curriculum.

Students who opt for the course love it; and the elective has been steadily gaining in popularity.

Some say a high-school social-dance course is a forward-thinking endeavor. While that may be so, the germane value is that it connects us to our past and broadens our cultural literacy.

Throughout human history, social dance defines civilizations, distinguishes ethnicities, clarifies anthropology, and even influences politics. When expertly taught, social dance reacquaints us with a more polite age.

"A boy should not sit out a dance if any girl is not dancing." One might recognize this advice from the 1934 book *Good Manners* from which we quote various rules in the "Classical Manners" column of every *Liberty Common Sense* newsletter.

Recent entries have featured guidelines about how young people should behave at dances. For example, "In asking for a dance, a boy says, 'May I have this dance?' The girl replies, 'Yes, you may'; or, 'I'm sorry, but this dance is taken.' Boys should avoid asking, 'Have you this dance?' or 'Do you want to dance?'"

Authored by the late **Beth Bailey McLean,** *Good Manners* was used in American high schools throughout the 1930s, '40s, and '50s. In fact, a review in the 1935 edition of *The Palm Beach Post* suggested, "Every home with children should have (*Good Manners*) on their shelves for constant reference." The old advice stands.

"If a boy is introduced to a girl at a dance, he must at once ask her for a dance. To omit this courtesy is very rude." In those days, most young people knew how to dance—respectfully with dignity and honor—and thus enjoyed ever-ready, wholesome fun.

To the bigger point: Knowing the history, the importance, and most of all, the manners and etiquette of social dance arms our young men and women with extraordinary advantages extending well beyond the possession of enjoyable dance skills. Social dance promotes healthy relationships among young people and gives them precise direction and confidence in how to interact properly with peers of the opposite sex.

In a classical context, perhaps a perfect summary of the cultural value of social dance is found at the *Blankeny Mannor* website which is dedicated to *The Scarlet Pimpernel* novels of **Baroness Emma Orczy.** In an essay entitled "The Social Etiquette and Politics of Dance" one finds, "Dance was considered to embody ideal Greek attributes such as wit, serenity, breadth of vision, love of harmony and order, personal courage, irony, fun, and a distaste of passionate excesses."

From a contemporary perspective, some research even asserts social dance prepares one for success in business. Dance-floor themes like teamwork, cooperation, consideration, mental dexterity, adaptability, respect, deference, and practice are of equivalent significance in a board room, or in an engineering group.

It's important to teach the cultural elements of social dance to Liberty students . It's a fabulous exercise for the brain, body and soul. Social dance is wonderful for building communication skills. It brings out joy in students' hearts and will last them a lifetime.

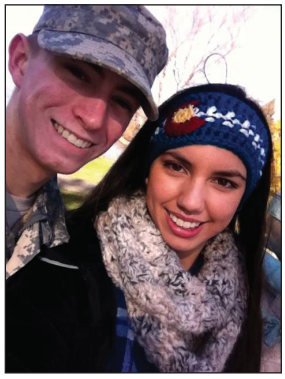
Liberty was first persuaded to add social dance after noting the longstanding success of Ridgeview's social-dance course. In keeping with the wisdom of classical themes, we tend to admire and to be inclined toward that which is proven, that which has worked and that which has led others toward truth, beauty, goodness and perfection.

Accordingly, Liberty's semester-long social-dance curriculum has proven to be a superb addition to our elective offerings. The course indeed leads our students further along the path toward mature literacy, mature virtue, and social elegance—with lots of joyful smiles along the way.

Homework About Homework

Bob Schaffer, Headmaster

It's a unanimous response. Ask any Liberty student whether they have too much homework and the answer is "yes."



Put the same question to LCHS graduates, and you'll get a deeper, more reflective reply. Following are a couple examples.

From Johns Hopkins University, **Anna Garcia** (LCHS '14) wrote, "For me, the main difference between homework in high school and homework in college is that rather than having small problem sets due daily (in high school), there are 30-40 question problem sets due weekly (in classes such as math and science). It really is a kind of forced studying and the best teachers focus their homework problems to helping you prepare for the content in tests. In math this means problems, in history this means explanation and prompts that test one's understanding.

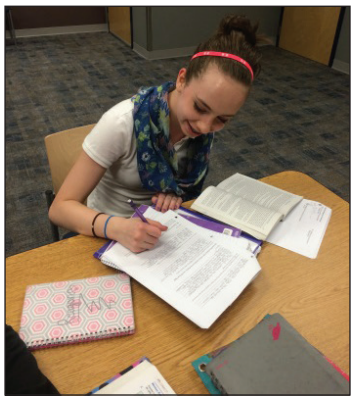
"As far as amount goes, I think it is comparable to what I am doing in college just separated differently as in all of my homework is due now on Thursday or Friday ."

Here's from **Christiana Spicer** (LCHS '13/Legio XIII) at University of Nebraska. "The homework load at Liberty, for me, was incredibly beneficial. While not all of the assignments were judicious, the vast majority were. The main homework at Liberty is from the math and English departments. These are the two subjects that I scored highest on for my ACT, and I believe that it has to do with the fact that I understood them better due to the assignments that **Mr. Lovely** and **Mr. Dybzinski** assigned to me throughout junior high and high school. I was taught a lot in the classroom, but doing math problems outside of class, and reading books and writing papers about them, are the things that taught me more than any classroom setting could have.

"Beyond that, having homework in high school taught me time management that has benefitted me throughout college. On top of all of my extracurricular activities (at Liberty), I had to find time to finish my homework at night, which meant that I was using every spare minute that I could. I carried this into college and find it easy to finish my assignments on time because of my time management.

"Some nights, the homework load at Liberty was too much, but other nights we wouldn't have any. It all depended. As long as students are diligent with their time, the homework is manageable, and in my opinion, incredibly beneficial not only for high school but also for college and beyond."

These two comments reflect, almost verbatim, the school's guiding philosophy on homework and reading as stated in the LCHS Student/Parent Handbook and the LCS Policy Manual.



Homework is a fundamental part of our general academic program. It prepares primary students for high school and secondary students for college, and for entry into the working world upon graduation. It also helps develop a strong work ethic and personal organizational skills.

At the elementary school, figure on ten minutes of homework per night per grade (this is not a rule, only a guideline). In other words, if your student is in the third grade, thirty minutes of homework per night on average should be about right. This is in addition to their required-reading expectations.

Once in the ninth grade, the homework load climbs —steadily—and varies according to the difficulty of one's elective-course choices. We're wary of busywork and insist homework assignments be strictly limited to meaningful exercises that prepare students for essential classroom success.

The immediate educational purposes of a prudent homework load are 1) To reinforce skills and concepts learned in class, 2) to develop study skills and habits, 3) to practice skills and knowledge in ways that are not readily accomplished in the classroom; and, 4) to inform parents of what is being taught in the classroom.

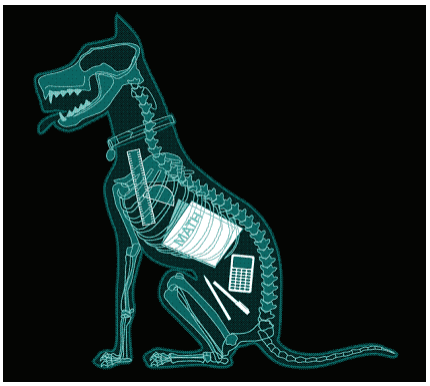
Homework assignments should be expected Monday through Thursday of each week and on some weekends. In addition to regular homework assignments, we expect each child to read, or (in the younger grades) be read to at least three times a week and preferably every day.

The amount of reading homework varies for each grade. Teachers will inform students what is expected for their grade level. As cited in *A Nation at Risk*, "the single most important factor for determining whether children will go to college is being read to as a child."

Indeed, our students take on a challenging, rigorous curriculum. This is one of the many things that make Liberty a great school. With such a rich and rigorous curriculum, the students need time to work at home. We are aware that the student is involved with other interests and activities outside of school.

The staff and administration attempt to coordinate schedules and calendars so the students are not inundated with work on the same day. It is understood that homework

will be given and will vary depending on the work assigned on a given day, the students' organizational skills and study habits, and the nature of the assignments.



Students are expected to learn how to use their free time effectively to complete the required work at each grade level. Parents are expected to support their children in this endeavor. Advanced classes entail additional homework time.

At the high school, each academic department has its own homework policy. Students are expected to know the policy for each of their classes. Students are expected to show responsibility in preparation for tests and perseverance in completing quality assignments.

To get a better understanding of homework expectations and goals at Liberty, please read through the school's homework and reading policies.

It is helpful for all students, and sometimes parents, to remember that the hard way through high school is the easy way through college.

Recommended Books

We ask all parents to read *The Schools We Need and Why We Don't Have Them* and *Why Johnny Can't Tell Right from Wrong*. We also encourage parents to read the other books from the list below in order to gain a better understanding of the philosophy of this school.

The Schools We Need and Why We Don't Have Them, E.D. Hirsch, Jr.

Why Johnny Can't Tell Right from Wrong, William Kilpatrick

Amusing Ourselves to Death, Neil Postman

Begin Here, Jacques Barzun

Brain Rules, 12 Principles for Surviving and Thriving at Work, Home, and School, John Medina

Climbing Parnassus, Tracy Lee Simmons

Cultural Literacy, E.D. Hirsch, Jr.

The Devil Knows Latin, E. Christian Kopff

The Disappearance of Childhood, Neil Postman

The End of Education, Neil Postman

Inside American Education, Thomas Sowell

The Plug-In Drug, Marie Winn

The Read-Aloud Handbook, Jim Trelease

Vision of the Anointed, Thomas Sowell

Copies are available at all school locations.

Contact Information

Liberty Common School (elementary grades K–6) are located at:

Plato Campus
1725 Sharp Point Drive
Fort Collins, CO 80525
(970) 482-9800
Fax: (970) 482-8007
www.libertycommon.org

Aristotle Campus
2130 W Horsetooth Road
Fort Collins, CO 80526

Liberty Common High School (junior-high and high-school grades 7–12) is located at:
2745 Minnesota Dr.
Fort Collins, CO 80525
(970) 672-5500
Fax: (970) 672-5499
www.libertycommon.org

Liberty Common School is a public charter school chartered by the Poudre School District in Fort Collins, Colorado. Enrollment at Liberty Common is conducted strictly by lottery. Children of all Colorado residents are eligible to attend Liberty Common School.

It is the right and responsibility of parents to direct the education and upbringing of their children.

Contribute to Liberty Common

Liberty Common relies upon frugal budgeting practices supplemented by free-will donations from parents and philanthropic organizations. This is an enormously important undertaking. To contribute to the school, or to volunteer to assist in the school's ongoing fundraising efforts, please click the "Online Giving" button at the school's website — www.libertycommon.org.

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LIBERTY COMMON SCHOOL

Common Knowledge, Common Virtues, Common Sense