Summer 2015

Leaders & Learners

The official magazine of the Canadian Association of School System Administrators

Association canadienne des gestionnaires de commissions scolaires

Bringing ART into STEM

CASSA-ACGCS
Promoting Quality Education for Our Students

Canada Post Mail Publications Agreement Number: 40609661

One Product, Many Solutions.

DuraSAFE™ Delivers.

INTRODUCING THE INDUSTRY'S FIRST AND ONLY

10 YEAR WARRANTY
Materials & Workmanship
INCLUDING
Impact Attenuation
to ASTM F1292

IPEMA CERTIFIED to ASTM F1292
INTERNATIONAL PLAY EQUIPMENT PUBLIC PLAY SURFACING MANUFACTURERS ASSOCIATION

SAFETY
HIC ratings under 700, free on-site testing, and 10 year performance guarantees.

DURABILITY
10 year wear warranty, even in high traffic areas.

LOW MAINTENANCE
No ongoing maintenance requirements to retain warranty coverage.

EASY REPLACEMENT
Interlocking design. Vandal proof. Quick and efficient replacement with in-house staff.

Tired of maintenance costs and expensive repairs?
Worried about safety and ADA compliance?

SofSURFACES has been engineering playground surfaces for over 20 years, and we know how to solve your problems. Engineered for performance, tested on-site, and backed by a 10 year warranty, DuraSAFE brings industry leading solutions to your playground.

SofTILE KrosLOCK®
DURASAFE SERIES™

SofSURFACES
Leaders in Fall Protection

www.SofSURFACES.com • 1.800.263.2363

NetSupport School - Classroom Management Software
that delivers whole school benefits

NetSupport
Celebrating **25 years** of software

With a 25-year development history and a worldwide installation base in excess of 13 million systems, NetSupport School offers a unique solution for the modern school: a single software solution that delivers benefits for the whole school, from the classroom to the technology department to the leadership team.

- PC monitoring, e-safety, collaboration, and unique testing and assessment features come together to help teachers deliver education best practice in an IT environment;
- Dedicated technicians' tools for the school-wide management of PCs help maintain a productive, secure, and fully operational IT infrastructure;
- Compatible with any mix of classroom technology - Windows, Mac, Linux, Chromebook and, to fully support your BYOD initiatives, Android and iOS tablets.

ISTE 2014 BEST of SHOW TECH&LEARNING

2014-2015 Award Winner

GESS EDUCATION AWARDS FINALIST 2015

Learn more about NetSupport's award-winning solutions and download a free trial at: www.netsupportschool.com

w: www.netsupport-inc.com | e: sales@netsupport-inc.com | t: 1-800-665-0808 (toll free)

Be a Hero
Help Save a Life

A Defibtech AED on your school grounds can make the difference between life and death.

Defibtech Lifeline AEDs

- Unprecedented ease of use
- Robust and durable
- Easy maintenance

MediQuest provides full training programs including Medical Oversight, and the tracking of all your AED servicing and equipment needs.

Defibtech's line of AEDs offers industry-leading technology that is sophisticated enough to meet the requirements of the most demanding first responders. Yet, they are also incredibly easy to use, so anyone can quickly and effectively save lives.

MEDIQUEST TECHNOLOGIES INC.

WWW.MEDIQUEST.CA
1.866.831.3227
INFO@MEDIQUEST.CA

Contents

MESSAGES

FEATURES

SPECIAL FOCUS

Summer 2015
PUBLISHED FOR:
Canadian Association of School System Administrators / Association canadienne des gestionnaires de commissions scolaires
1123 Glenashton Drive
Oakville, Ontario L6H 5M1
Tel: 905-845-2345
Fax: 905-845-2044
www.cassa-acgcs.ca

PUBLISHED BY:
Matrix Group Publishing Inc.
Publications Agreement Number: 40609661
Return undeliverable Canadian addresses to:
309 Youville Street
Winnipeg, MB R2H 2S9
Toll Free: 866-999-1299
Toll Free Fax: 866-244-2544
www.matrixgroupinc.net

President & CEO:
Jack Andress

Publishers:
Peter Schulz, Jessica Potter

Editor-in-Chief:
Shannon Savory
ssavory@matrixgroupinc.net

Editors:
Meg Crane
mcrane@matrixgroupinc.net
Alexandra Walld
Danelle Cloutier

Accounting/Administration:
Shoshana Weinberg, Pat Andress, Nathan Redekop, Lloyd Weinberg, Joe Strazzullo
accounting@matrixgroupinc.net

Director of Marketing & Distribution:
Shoshana Weinberg

Sales Manager - Winnipeg:
Neil Gottfred

Sales Manager - Hamilton:
Jeff Cash

Sales Team Leader:
Colleen Bell

Matrix Group Publishing Inc. Account Executives:
Alex Incretolli, Angie Carroll, Bonnie Petrovsky, Brian Davey, Brian MacIntyre, Chad Morris, Darcy Lebel, Dawn Russell, Frank Kenyeres, Idel Galbete, Jim Hamilton, Lisa Ockenden, Miles Meagher, Nalini Singh, Rachel Purvis, Rick Dougay, Rick Kuzie, Rob Allan, Rob Gibson, Shalynn Ramsden

Layout & Design:
Cody Chomiak

Advertising Design:
James Robinson

BULLYING • INTELLECTUAL ENGAGEMENT • SCHOOL COMPLETION • INCLUSION

What value do you place on reliable student insight?

DRIVERS OF STUDENT OUTCOMES • SCHOOL HEALTH • RISKY BEHAVIOURS • ADVOCACY

How about teacher insight?

STUDENT ENGAGEMENT • WHOLE SCHOOL IMPROVEMENT • SELF-ESTEEM • EFFORT

Parent insight?

OurSCHOOL is a research-based system that collects, analyzes, and reports on factors known to affect school climate, safety, and student outcomes. It uses insight from students, teachers, and parents to accurately inform school improvement planning and monitor progress.

OurSCHOOL

INFORMING SCHOOL IMPROVEMENT

For more information:

www.thelearningbar.com or call 1.877.840.2424

Although these individuals were not teachers, they have unwittingly inspired many educators to find innovate ways to blend the STEAM subjects.

Cindy Finn
CASSA/ACGCS President

Welcome, readers!

In this issue, we continue to explore science, technology, engineering, arts and math (STEAM) initiatives. These are the ways in which subjects are being innovatively combined in education. From all accounts, STEAM is gaining interest among teachers, administrators and professionals.

STEAM is not only generating excitement in kindergarten to Grade 12 education circles, it has also taken off in other segments of society. Think for a moment about three individuals whose careers exemplify the intersection of these disciplines: Steve Jobs, Dr. Randy Pausch and Chris Hadfield.

What do these figures have in common? Apart from obvious talents that helped catapult them to fame as a technology guru, computer science wizard and musical astronaut, respectively, one can also argue they should be counted among the pioneers of STEAM.

Jobs was a visionary in the technology world; he created today's reality of personal computing. However, his accomplishments go beyond computer science and technology. He was also interested in music, literature and the visual arts. Jobs was not only driven to produce efficient computing machines, he paid equal attention to aesthetics and industrial design.

He is reported to have insisted that Apple devices be of a "museum of modern art quality," an appreciation that undoubtedly shaped while attending a private liberal arts college. He sought to inspire engineers to create fonts and graphic interfaces that were sleek and pleasing to the eye, an appreciation he partially credited to a course he took on calligraphy while at Reed College.

The same drive to intertwine technology and the arts is found in the work of Pausch, a computer science and design professor at Carnegie Mellon University (CMU) and co-founder of the Entertainment Technology Center.

Within academe, he was a pioneer in the area of virtual reality, combining his technological talents with his interest in gaming, entertainment and science fiction.

Outside of academic circles, he is known for a famous lecture given at CMU and a book he wrote shortly before his death in 2008. The subject was how to achieve one's childhood dreams. His dreams were fueled by passions that included computer science, television and movies.

Hadfield has also pushed the STEAM envelope. His facility for math and science lead him to pursue his dream of becoming an astronaut, but it was his interest in the arts and use of social media that contributed to his notoriety.

His photographs of Earth and his rendition of a classic David Bowie song with little more than a guitar and a tablet while commanding the International Space Station reveal the power of STEAM in action.

Although these individuals were not teachers, they have unwittingly inspired many educators to find innovate ways to blend the STEAM subjects. Everyday examples abound in Canadian schools and our goal was to bring these narratives to you, both through the magazine and our annual conference this year in Montreal. May these stories serve to inspire and innovate.

Bonne lecture!

EPSON
EXCEED YOUR VISION

$99 Replacement Lamps

3x Higher Colour Brightness* with Epson®

New BrightLink® Interactive Projectors

Now with Finger Touch & Gestures.

Epson BrightLink is compatible with top interactive software.

SMART Promethean mimio

9 out of 10 people prefer images from Epson projectors**

Learn More: epson.ca/K12

*Colour brightness (colour light output) measured in accordance with IDMS 15.4. Colour brightness will vary depending on usage conditions. Leading Epson 3LCD business and education projectors compared to leading 1-chip DLP projectors, based on NPD data for June 2013 through May 2014 and PMA Research data for Q1 through Q3 2013. **Among people who had a preference, 9 out of 10 preferred images from leading Epson projectors over leading 1-chip DLP business and education projectors. Leading projectors selected according to NPD data as of July 2013. Based on independent U.S. research conducted by Radius Research (July 2013).

GIVE YOUR STUDENTS AN UNFORGETTABLE LEARNING EXPERIENCE

CINEPLEX®
GROUPS AND EVENTS

• Discounted admission for groups of 20 or more for regularly scheduled films* • One free admission with every 20 tickets purchased • Flexible dates and show times for groups of 100 or more • Discounted concessions • Teacher's resource guides free for select films

Contact us today at

Cineplex.com/GroupSales

or 1-800-313-4461

*Restrictions may apply

As you read this, you are either close to the end of another school year or you are off enjoying the summer when you have more time for reading. Some of you may actually be in Montreal at the CASSA 2015 Annual National Conference. Regardless of your circumstance, thanks for reading our journal! I know you will find it professionally worthwhile.

I am going to begin by welcoming our newest members from Saskatchewan. The members of the League of Educational Administrators, Directors and Superintendents of Saskatchewan (LEADS) have joined CASSA.

Their representatives on the board of directors are President Don Rempel and Executive Director Dr. Bill Cooke. We look forward to their voices around the table as we move forward as the national organization of school system leaders!

This issue is primarily dedicated to an examination of the many ways in which schools and districts are integrating science, technology, engineering, arts and math (STEAM) into the educational experiences of our students.

STEM is likely better known and recognizable to many educators. The addition and integration of the arts has been growing in classrooms in Canada, the United States and abroad! The inclusion of meaningful and authentic arts programming, including language arts, fine arts and performing arts, distinguishes STEAM from STEM.

While a focus on STEM will no doubt pay dividends as schools produce tech savvy graduates who can step into high tech jobs, the inclusion of the arts underscores the need to have creative, curious, innovative thinkers!

In *Great to Excellent: Launching the Next Stage of Ontario's Educational Agenda* the Ontario Ministry of Education identifies that its graduates need to demonstrate the following qualities: character, citizenship, communication, critical thinking and problem solving, collaboration, and creativity and imagination.

Certainly one can see how STEAM, including the arts, can provide the opportunity needed to ensure graduates can demonstrate those qualities!

Indeed, the articles in this issue from across the country, including the Northwest Territories, Alberta, Ontario, Quebec and New Brunswick, demonstrate that both STEM and STEAM are alive and well, thriving in our schools.

As I was broadening my own understanding, I came across a number of American websites. Two that were devoted to the inclusion of the arts into the more "traditional" STEM subjects were www.steamedu.com and www.stemtosteam.org. I recommend them to you and hope someday to find Canadian websites with a focus on STEAM!

As I finish off, I want to express my appreciation to the CASSA board of directors for its support of and commitment to the goals and beliefs of the organization! The board comes together once a month as volunteers to share insights from across the country.

Ken Bain
CASSA/ACGCS Executive Director

What is on the horizon for CASSA? The two 2015-2016 *Leaders & Learners* journals will examine equity, social justice and social responsibility, and will lead into the CASSA 2016 Annual National Conference in Winnipeg, Man. The conference will include the Canadian Museum for Human Rights as its centerpiece.

The CASSA board will also spend time each month examining what is being done in the area of student mental health in the CASSA member provinces and territories.

I hope that each of you has a wonderful and safe summer break!

2015 CASSA/ACGCS Executives

PRESIDENT
Cindy Finn
Lester B. Pearson School Board

PAST PRESIDENT
Roger Nippard
Foundations for Future Charter Academy

EXECUTIVE DIRECTOR
Ken Bain
CASSA

PRESIDENT ELECT
Anne O'Brien
Durham Catholic District School Board

AASA WESTERN REPRESENTATIVE
Barry Wowk
St. Albert Public Schools

AASA EASTERN REPRESENTATIVE
Nick Milanetti
Dufferin-Peel Catholic District School Board

CASSA Board of Directors

OPSOA (Ontario): Warren Kennedy and Shawn Moynihan

OCSOA (Ontario): Theresa Harris and Simone Rose-Oliver

CASS (Alberta): Barry Litun and Karl Germann

ADGESBQ (Quebec): Bob Mills

NWTSA (Northwest Territories): Metro Huculak and Curtis Brown

AAESQ (Quebec): Steven Colpitts

MASS (Manitoba): Barb Isaak and Ken Klassen

NLASSA (Newfoundland and Labrador): Eldred Barnes and Jeff Thompson

NBSSA (New Brunswick): Greg Ingersoll

LEADS (Saskatchewan): Dr. Bill Cooke and Don Rempel

Director At Large (PEI): Cindy Fleet

2015

Learning & Laughing at Junior Voyageurs

By Adrian Geller

Students in the junior chef class.

Students creating the "Land of Giants."

What is the best recipe for learning and laughter?

How about having teachers teach what they are most passionate about to small groups of super keen nine- to 13-year-olds? And doing this within a creative, hands-on, inquiry-based learning atmosphere?

Using this recipe, Junior Voyageurs summer enrichment camp was launched three years ago as one of the many excellent offerings of the Lester B. Pearson School Board. The camp, inspired by the science, technology, engineering, art and math (STEAM) movement, focuses on the areas of art, science and technology. The approach gives us the ideal framework to develop interdisciplinary projects presenting a high level of inquiry. After all, creativity is an essential component of what drives innovation.

Based on teachers' interests, passions and areas of expertise, the camp offers an eclectic mix of courses such as space-bots, musical theatre, sewing and clothing design, culinary arts, geocaching, video production, robotics, journalism, science of things that fly, forensics and more.

One of the founding principles of the camp is the idea that teachers have an opportunity to really foster the inquiry learning process given the smaller number of children with whom they are working. In this fashion, powerful professional development unfolds, which inevitably translates into more sophisticated and inspired instruction during the normal school year. A win for teachers, a win for campers and a win for schools in general!

Another big part of the program is the "campfire" chat that takes place daily. Here, students share their experiences with the four Cs: courage, creativity, consideration and collaboration. In these discussions, campers nominate classmates to be recognized for exhibiting these values. In turn, their names are placed on the "4C's Wall of Honour," reinforcing the very values that underlie so much of what is needed in inquiry-based

Continued on page 14

Vesey's Bulbs
FUNDRAISING

EARN 50% FROM EVERY PURCHASE

- A SIMPLE PROGRAM YOU CAN USE EVERY YEAR
- YOU EARN *50%* ON *EVERY* SALE YOU MAKE
- ALL PRODUCTS ARE GUARANTEED
- AVAILABLE IN FRENCH & ENGLISH
- ALL SHIPPING IS FREE

"Packaging was super! So easy to count and so well organized – thank you so much! Doing this fundraiser convinced me to do it again this fall and next spring."
– **Carrie McDonald, Rockwood Public School**

Call or click today to receive your ***FREE*** Information Kit & Supplies

1-800-363-7333 • www.veseys.com/fundraising

CANADA'S GREEN FUNDRAISER

Continued from page 12

learning—especially the courage to push through the fear of failure.

In fact, there is not a single day that the message of "Success through Failure" is not repeated over and over again to both teachers and campers. It is of paramount importance that everyone at Junior Voyageurs knows it is not only acceptable, but expected, that they take risks, follow hunches, push boundaries and fail occasionally. Through this process, success is born. Essentially, the message to all is that creativity and innovation is a messy business, so go get messy!

In terms of the nuts and bolts of the camp, Junior Voyageurs runs for two weeks in early July, with campers registering for two courses—one morning and one afternoon. This structure allows them to experience two areas of interest, while ensuring teachers have enough time to really delve into the content of their courses and develop meaningful projects.

To deepen learning, teachers organize field trips to show how their course relates to the real world. For example, campers in Passion for Fashion (sewing and clothing design) visited designer Joseph Ribkoff's dressmaking studio in Dorval, Que.

Teachers also invite experts and professionals from the field, such as CTV meteorologist, Laurie Graham, who came and did a live weather broadcast with students from Forecast: Fun!

On the afternoon of the final day of camp, an Open House and Performing Arts Gala is held. Parents and other guests visit the various classrooms where campers share their creative projects. These include, for example, robotics demonstrations, graphic novels, food samples, geocaching blogs and a wide variety of art work. After visiting classrooms, guests come to the gym where they watch performances from our acting, singing and fashion courses.

Based on results from an annual survey, parents and campers are satisfied with Junior Voyageurs. Below are some parents' comments:

- "We were very impressed with the organization, energy and activities of the camp. This is the first camp ever that our daughter was excited to attend every morning."
- "I love how committed and passionate the teachers are. And Adrian is the best. I also love how he greets the kids in the morning when they arrive. It makes them feel special and welcomed."
- "We are so incredibly impressed with your responsiveness, flexibility and high caliber of program. We are in the French school board and had it not been for a friend mentioning this program, we may not have considered it."

The camp owes a debt of gratitude to Michael Chechile, senior director at the Lester B. Pearson School Board, who has fully supported the camp over the years. As well, a word of thanks to Principal Rachel Wilson, who, year after year, welcomes and hosts Junior Voyageurs at Clearpoint Elementary School.

Looking forward to many more years of learning and laughter at Junior Voyageurs! ○

Adrian Geller has been a passionate advocate of experiential education for 25 years, always striving to make teaching and learning more active, engaging and relevant. He has taught in elementary schools and is currently the principal of Margaret Manson Elementary School.

3D Printing

Welcome to the 21st Century!

By Ray Suchow

At the beginning of this school year, a 3D printer arrived in my classroom and a dynamic new path of learning revealed itself. Whether it involved students becoming proficient in leveling the build plate and loading filament, completing their first Tinkercad[1] lessons to improve basic design skills, or creating—and then printing and reverently holding—their first custom 3D design, the learning curve has been steady but definitely rewarding.

Our division's tech department assisted in the purchase of the MakerBot Replicator2. Ultimately, we purchased our unit and a 10-roll multi-coloured filament pack from NCIX. When it arrived, the only assembly involved removing a few travel clips and attaching the spool-holder. We were now ready to print—almost!

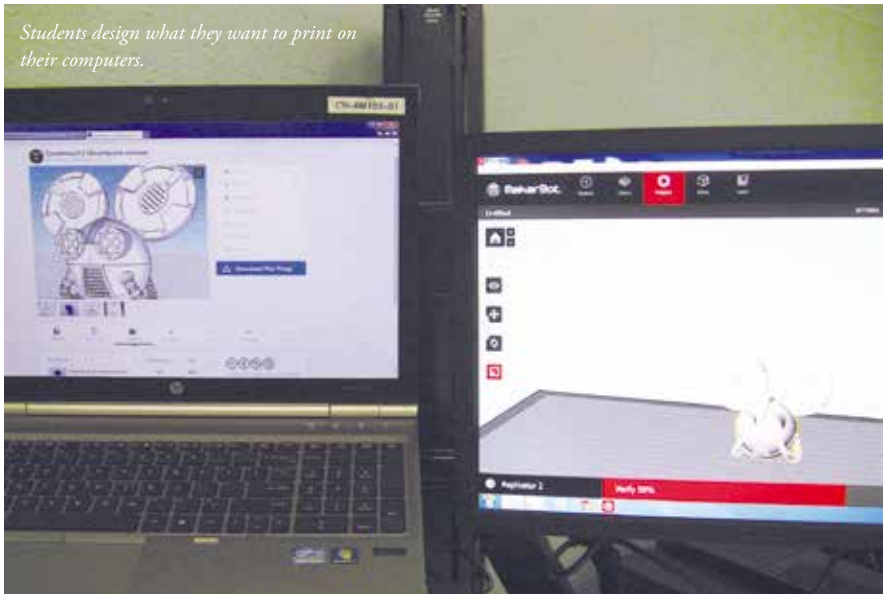
Two other items were required—an absolutely stable printer platform and a dedicated computer to run the software and direct the MakerBot printer. A low, solid set of shelves, anchored to the floor, with room for a spare laptop, proved to be rock steady. My lab's 3D printer station was born.

The importance of a stable platform cannot be overstated. In standard detail, the height of each print layer is 0.2 mm. Finer (0.1 mm) resolution is also available.

Even a gentle bump could interfere. With our setup, we have not experienced any disruptions (other than excited students wanting to touch the object currently being printed), so an explanation about keeping eager hands away until each print is completed proved useful.

We began to print and wondered about cost per item. With a few calculations, we derived a cost of 7c/g. Since the software displays the amount of filament being used beforehand, exact costs could be calculated if necessary. Most student projects cost less than two dollars.

Ray Suchow showing off the new 3D printer with his students.



Students design what they want to print on their computers.

The development and awareness of science, technology, engineering, art and math (STEAM) elements into our initial units occurred quicker—and in richer measure—than we had hoped for. Our 3D printer has become an incredible exemplar for these elements, since students are continually fascinated by the processes involved and *want* to learn how it works.

In little time, the process of demonstrating and explaining how an object (visible on the laptop) is first created and sent to the MakerBot, where PLA filament (similar to Lego plastic) is then fed, melted (the

temperature being visible on the front panel) and swiftly stacked in sub-millimetre layers, is *absorbed* by students—it brings several elements of STEAM together in a swift moving, user-friendly blend of disciplines.

Much to our surprise, STEAM began to pick up steam, so to speak. Although our 3D unit began with the 10 Tinkercad lessons, followed by the modification of an existing template (the most popular choice being personalizing and printing cellphone cases) and concluded with the design and printing of their first custom object, we found that a number of students wanted to create objects that could be used in other subjects.

Students began leading STEAM incorporation into other subjects! Their designs have included a new aquatic life form for biology, ornate scroll handles for our musical theatre production and a soccer field teaching display for physical education.

As we used the printer, we learned some best practices. Each discovery enabled us to improve the efficiency of how we maintain the printer as well as how students create and complete projects, including:

1. **Level the build plate every two weeks:** This has proven to be sufficient to ensure accurate prints.
2. **Do not lose the level card:** This paper allows you to calibrate the build plate to a few hundredths of a millimetre efficiency.
3. **Put new painter's tape on the build plate once a month:** Our first few prints were directly on the acrylic build plate and were difficult to remove. Once we began printing on the painter's tape, removing designs became easier.
4. **Understand the proper use of rafts and supports to avoid waste and print time:** While designing in Tinkercad, there is no gravity and objects can be designed and rotated with ease. However, once on the build plate, flat structures benefit from adding a raft (a clickable option in the software) that enables easier removal once done. Extended structures (like vertical rockets and horizontal wings) require supports, which are light plastic scaffolds enabling objects to be printed with high detail in mid-air.
5. **Keep tweezers and a nail file nearby:** Fine tweezers enable us to easily pry the raft off of the tape, after which the object can be removed from the raft by hand. The file allows any small filament tags to be quickly and smoothly removed.
6. **Return filament spools to their bags:** This keeps dust and grit from attaching to the filament, which could alter the print colour and quality of objects.
7. **Create an exemplar wall:** Currently, a wall in my classroom has examples of all 10 Tinkercad lessons, a display of selected students projects and the initial results of my team's research interests, which currently center on how to create multi-colour objects with a one-colour printer.

Students began leading STEAM incorporation into other subjects!

As we look towards next year, one project draws our attention as a distinct means of building upon and furthering the progress we have already enjoyed. The CityX Project[2] enables interested students to learn real world design processes by creating an object critical to supporting a fledgling colony on Mars.

Through a process of design, consultation and revision, a 3D object will be designed and printed in much the same manner that has already happened onboard the ISS.[3] By engaging students with professionals around the world, their designs can have industry level critique and advice.

For our first implementation of this project, a student worked to create a self-contained solar array which will be able to withdraw into a protective container in the event of Martian sandstorms, yet be able to unfurl from said container to generate energy.

Paula Mellon, a solar-industry consultant based in San Diego, Calif., generously agreed to assist in the critique of our student's design.

The arrival of my school's 3D printer initiated an amazing learning journey for students and staff. With the interest that has been generated across many subjects, the successes we have enjoyed and with what we look forward to accomplishing, it feels like the promise of the 21st century has truly arrived in my classroom. ○

Ray Suchow teaches computer studies and religious studies at Christ The King School in Leduc, Alta. He is enjoying (and celebrating) his 25th year of being a technology educator.

References

- www.tinkercad.com
- www.cityxproject.com
- www.nasa.gov/mission_pages/station/research/news/3Dratchet_wrench/#.VRi4glrIOWU

Setting the Direction of the Moral Compass

Students take their places for lunch.

The "poor" students share a cup of rice.

The "rich" students enjoy service and pizza.

By Cheryl Ricco

Integrating social justice themes within science, technology, engineering, art and math (STEAM) subjects is an excellent way for educators to make learning meaningful and concrete for 21st century students. With ample online resources, educators can locate and create social justice lesson plans that reflect current local and global issues.

These lessons can help students locate the direction on their moral compass and assist them in becoming responsible and caring global community members.

One activity used to inspire social action by students is a Hunger Awareness Meal. Jennifer Nychuk, teacher at Sacred Heart Catholic School in Kirkland Lake, Ont., tried this activity. It was based on the Lutheran Peace Fellowship lesson ideas found at http://lutheran_peace.tripod.com/HungerAwarenessMeal9d.pdf.

She invited her Grades 5 and 6 class to host a lunch for some Grades 4 and 5 students. The meal was structured to teach students the economical differences between the rich, middle class, working class and poor, and incorporated concepts of financial literacy and data management to effectively demonstrate the social class divide and its impact on hunger worldwide.

Although the Grades 4 and 5 students required some background knowledge about percentages and data management concepts to fully grasp the information, the use of drama to highlight math concepts engaged students and provided a great starting point to learn about decimals, percentages and graphs in future math lessons.

Whispers and giggles filled the gymnasium as the Grades 4 and 5 students entered the room and were given a piece of coloured construction paper. Their curiosity was immediately peaked! Some students looked relieved when given the same colour as their friends. Others seemed to be concerned.

When they were invited to sit in their designated eating spaces based on those pieces of paper, the realization of unequal division became quite apparent. With a slight hesitation by the guests, the Grades 5 and 6 hosts escorted their peers to their seats.

Two students were led to a small table, fully dressed with plates, glasses, tablecloth, napkins and their own personal servers; they were both given a large pizza. Four students were led to an area with tables and chairs; they were given hot dogs on plates with napkins and bottled water. Nine students were invited to sit in chairs and were each given a bagged sandwich and bottle of water. The remaining 15 or so students were asked to sit on the floor and share a small bowl of rice, without utensils.

As one would expect, the reactions by the guests were varied when Nychuk encouraged everyone to dig in and enjoy their meal. The two students with pizza laughed at their friends and quickly stuffed pizza into their mouths. The students with hot dogs smiled as they ate. The students with sandwiches were not as pleased as their wealthier counterparts, but when they

realized this was the only meal they would have, they ate. Alas, the students with only one bowl of rice to share with each other were silenced.

Some were visibly angry and refused to participate, stating it was not fair that they had to eat rice. Others wanted to eat, but did not want to have to share with everyone else. Others wanted to be excused so they could go and get the lunch that they brought to school. Their moral compass had been given direction!

As the meal progressed, Nychuk's students began to read statistics about poverty to their peers. Even if students had no formal understanding of percentages, they understood the key message: there are more people in poverty in this world then there are rich and yet the rich have more food. Nychuk's students also read personal accounts by children all over the world who suffer from hunger daily.

As each statistic was read, the fact was posted on a box and placed in front of the two students eating pizza to create a visible barrier between the rich and the rest of the "world." Nychuk then asked students from each group to share how they felt about being in that particular social class. One of the two students eating pizza raised his hand and stated that he felt very guilty for having so much food and not being able to share it with his friends.

"Why do you feel guilty?" Nychuk asked. "What have you done wrong?" The student smiled and admitted that he felt better when the wall of boxes was blocking his view from his friends because then they could not see him eat the pizza. "So, what does that wall mean in real-life?" Nychuk probed.

"The wall blocks the rich from really seeing anyone else but themselves," the student replied. Nychuk turned to the students who represented the poor and asked, "If this was the real world and you chose not to eat what little was provided for you, what do you think would happen?" Several students responded in unison, "We'd die."

Hosting a hunger awareness meal gave students the opportunity to develop their own perspective on the global economy and have a better understanding of the impact their economic choices have on the world they live in.

The richness of the activity also provided Nychuk and her colleagues with a launching point into possible science lessons about the immediate and long-term effects of energy and resource use on society, or technology lessons on how industrial technologies in developing countries affect the local and global communities.

In essence, teaching STEAM subjects through the lens of social justice makes learning meaningful for students in the 21st century. The Grades 4, 5 and 6 students at Sacred Heart Catholic School were not only given a better sense of who they are within the global community, they were inspired to continue to set the direction of their moral compass and follow it. ○

Cheryl Ricco is a principal in the Northeastern Catholic District School Board. As a writer and educator, Ricco believes in the creative process and allowing students the opportunity to discover and learn through collaboration and creativity.

For more information on financial literacy education in Ontario, visit www.edu.gov.on.ca/eng/surveyliteracy.html.

Full STEAM Ahead

Grade 4 students competing at parent and child robotics evening.

Grade 4 and 6 students collaborating on an NXT robot.

Students building a New France Seigneury using Wedo robots.

By Mat Canavan

Through these projects, students will learn to develop self-assessment and evaluation strategies as well as error detecting procedures.

The science, technology, engineering, art and math (STEAM) project at St. Charles School in Quebec, is a school-wide project focusing on using the inquiry method of learning to create projects covering specific content and competencies. The projects engage students with technological devices, such as iPads and robotics kits.

How it started

Previously, there was no framework for integrated projects. Some teachers began sharing ideas about integrating iPads and robotics in class, which was well received.

Sophie Lussier, one of our school board consultants, suggested we formalize our ideas. Throughout the year, three teachers were trained as technology specialists through workshops, conferences and release time. One specialized with iPads, one robotics and one Google apps.

We created a safe environment for teachers who were less comfortable using technology. Lussier made herself available to them and gave in-class support.

Formal support was gained from teachers, our governing board and the Lester B. Pearson School Board. We concluded the year with a teacher workshop over-viewing the Smarter Science Framework.

Implementation

We train teachers to use the Smarter Science Framework through two half-day sessions with Lussier and Rebecca Binet, our math consultant. Afterwards, Lussier's role is to coach teachers and create, administer and evaluate projects. Binet's role is to support teachers in integrating relevant math competencies into projects.

Once objectives are in place, teachers determine what technological tools will help with the learning experience. We are careful to use technology as a concrete tool. This approach increases teachers' openness to taking risks because it allows students to achieve learning objectives that would otherwise be out of reach.

Lussier and Binet also help teachers incorporate content and work on competencies that can be used as evaluation on report cards. We display projects online and at our open house in January.

Future success

There are a number of factors that ensure the continued success of the project. The first is teachers' positivity and willingness to learn. Some are technologically capable and some are less comfortable with technology. However, all are willing participants.

The second factor is the support received from the consultants. Lussier is in our school weekly and Binet is in almost as often. They work hard to demonstrate that STEAM is not just another initiative being piled on, but rather a better way of improving student success. As our teachers become more capable, the need for consultant support will be less and we will be in a position to act as mentors to other schools.

Why STEAM?

We believe students become engaged when given good questions rather than answers.

Continued on page 22

Active Office

Revive Your 9 to 5

Change The Way You Work with a VARIDESK Sit Stand Desk

The **VARIDESK®** is a height adjustable standing desk that comes fully assembled and works with your existing furniture. Move from sitting to standing, and back again, in just 3 seconds.

adjustable • affordable • no assembly

JARVIS
Sit-Stand Solution

SWOPPER
Active Sitting

EVOLUTION CHAIR
Healthy Seating Solution

MUVMAN
Perfect for Standing Desks

ACTIVE STANDING
+ More!

fitterfirst
balance and fitness for life

www.fitter1.com

1-800-fitter1

100's of Great Active Office & Balance Products

Continued from page 20

We believe teachers are motivated by innovative ideas. That motivation only persists if ideas are supported by concrete learning objectives, efficient delivery procedures and real support to achieve measurable success.

Inquiry-based projects allow students and teachers to undertake a learning experience where feedback will be a vehicle to further learning. Through these projects, students learn to develop self-assessment and evaluation strategies as well as error detecting procedures.

Using the STEAM approach to learning allows us to focus on inquiry and problem solving in a way that the students will learn appropriate content and develop the right competencies. We have the ability to inspire teachers and students while providing them with real learning experiences that are relevant for both ministry exams and real life. ○

Mat Canavan is the principal at St. Charles School in the Lester B. Pearson School Board.

A teacher's perspective

La technologie est un domaine en constante évolution qui frappe aux portes de nos institutions scolaires. Nos enfants y sont exposés de plus en plus et sous diverses formes. En tant qu'enseignante, je me plaît à apprendre de nouvelles choses et à relever de nouveaux défis. Et cela même si cette nouveauté me fait peur ou me rend nerveuse puisque je sors de ma zone de confort.

L'intégration de la technologie dans mon enseignement a débuté avec les ordinateurs et ensuite le tableau interactif. L'an passé il y a eu l'arrivée du iPad au sein de mon école. Ce petit outil technologique a éveillé ma curiosité. Je suis plutôt à l'aise avec un PC! Je me suis donc amusée à découvrir une application d'écriture pour les élèves. Ainsi je fus en mesure d'intégrer le iPad dans mon enseignement.

Cette expérience fut incroyable! Les élèves ont écrit une histoire en équipe de deux. Ils ont mis a profit leurs connaissances en écriture, ils ont dû travailler en équipe et faire preuve d'ouverture d'esprit... Ils ont fait une production écrite avec un nouveau médium tout en s'amusant et en démontrant plusieurs compétences.

Ensuite, il y a eu la robotique. Cette dernière étant déjà intégrée par plusieurs collègues, fût une découverte pour moi. J'avais l'impression que la robotique était très difficile et compliquée. Mais quelle ne fut pas ma surprise de constater que ce n'était pas le cas! Ce constat a été fait après avoir participé à un atelier.

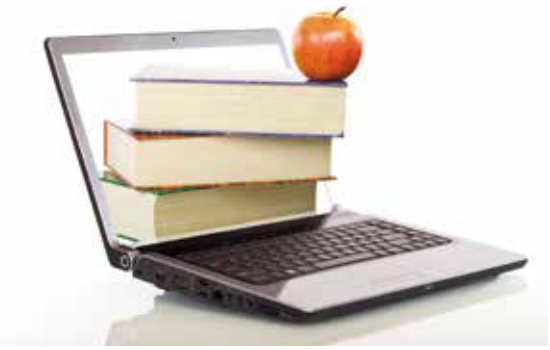
On pouvait réaliser de beaux projets en robotique et c'était beaucoup plus simple que je le croyais! J'ai tout de même demandé à ma conseillère pédagogique de venir m'appuyer dans mon application en classe. Les élèves ont adoré faire de la robotique. Même les élèves ayant des difficultés ont réussi à participer. C'était beau à voir!

Cette année, mon défi, et ceux de mes collègues, s'appelle STEAM!! Je suis intriguée, excitée et en même temps insécure face à ce nouvel outil pédagogique intégrant la technologie. La bonne nouvelle dans tout ça est que nous aurons du soutien quant à la mise en place et l'application de ce nouveau programme.

—Julie Dominique, Grade 1 (1re année), St. Charles School

Meaningful Technology Integration

By Tiffany Austin and Paul Stewart



Teachers must stay current with technological trends and meaningfully incorporate technology into classrooms. The successful integration of technology can increase student engagement and motivation, provide a platform for social change and allow students to access assistive devices.

Understanding the future workplace is important in recognizing the importance of technological competency. "Today's workplaces and employers value people with abilities to solve complex problems, adapt their learning to untested situations and collaborate productively with others."[1]

Students must prepare for key competencies that will change over time. Digital and technological fluency helps students develop critical thinking, problem solving and decision making skills. It prepares students with transferable skills necessary for successful careers in changing industries.

One challenge is digitally hesitant parents and educators lacking the confidence to teach essential 21st century skills. As a result, many school boards have blocked access to important technological tools.

Minimizing online access does not increase safety. Instead, educators need to establish policies and guidelines to keep students safe online. Students need to learn to appropriately and responsibly navigate technology. By focusing on digital citizenship, students can personalize their learning, build learning capacity, engage the public and access online resources.

Once educators feel comfortable, they may explore possibilities for students to engage in global social justice issues through blogs, reports, petitions and open letters. With access to a global platform, students are more likely to engage in cross-curricular content.

Another advantage to incorporating technology is assistive technology tools. These devices level the playing field for students by allowing them to access curriculum more readily and on pace with their peers. They are able to approach learning more independently and with increased confidence.

There are numerous examples of assistive technology that influence student achievement.

Continued on page 24

Continued from page 23

Voice-to-text software helps reluctant writers express their viewpoints. *Read Write Gold* allows students reading below grade level to research topics, highlight important information and have it read to them. *Livescribe* pens can record a lecture while a student takes notes. By increasing student proficiency with technology, educators encourage students to be independent learners responsible for their own success.

Technology also enables collaborative work for teachers and students. Apps such as Google Docs allow documents to be created and edited from multiple computers in real-time. This may be used for group projects. Teachers may upload documents they can edit as a grade team or school. The possibilities are numerous and provide an opportunity to streamline assignments.

Exploring possibilities of integrating meaningful technology into the classroom requires a commitment to inform and support digitally hesitant colleagues. Instructional leaders need to share relevant technology with colleagues.

Sharing success stories is one way to motivate colleagues who are cautious about technology. This is a powerful asset for instructional leaders to share experiences and model best practices. In this way, they are able to build trust and start conversations.

By allowing students to express themselves in an online environment, student learning is enriched and teachers have access to gauge their progress.

The benefits of technology are vast, however it is important to acknowledge challenges, including cost, lack of support and inadequate training for educators.[3] It is important to balance innovation with implementation to ensure challenges are minimized and stakeholders are given the opportunity to provide feedback so adjustments can be made.

It is easy to become overwhelmed with the many proposed technological innovations. By allowing staff to work toward technology integration in small steps, fears may dissipate as confidence increases.

The integration of meaningful technology encourages digital citizenship, enhances social change efforts and advances 21st century learning. These tools help educators prepare the next generation for the future workplace. The successful integration of technology allows for accessibility, flexibility and collaboration among staff and students. By embracing technological initiatives, we ensure that our education system prepares students to explore and generate future innovation. ○

Tiffany Austin, a teacher with the Calgary Board of Education, is pursuing her M.Ed. at the University of Calgary. Austin is passionate about technology integration in classrooms and loves collaborating with others to promote forward-thinking best practices in education.

Paul Stewart is associate superintendent with Red Deer Catholic Regional Schools. Stewart is active helping the three Es move forward. Instructional leadership is an area Stewart likes to spend time in.

References

1. Davidovich, R. (2011). To tackle new problems, we're going to need new solutions. *JSD.* 32(2), 42-45. Retrieved from www.learningforward.org.
2. Caruso, C. (2008). Bringing online learning to life. *Educational Leadership.* 68(7), 92-93.

Participation, Pride & Perseverance

By Julie Hobbs

Reflecting on the ArtsSmart project, one student says, "I realized that we had to talk about beats and fractions… And when we did this, I started doing my fractions better and my drumming better, as a matter of fact."

Students, Grades 7 through 11, in a Gaspé, Que. high school, participated in the ArtsSmarts project through the expertise of a local musician, their art teacher and their community learning centre coordinator. This drumming initiative is one of many introduced to English schools in Quebec using an arts-integrated approach to address student engagement and learning.

Students say this project had a permanent impact on the way they understand their learning. They are one of about 60 groups of students over a four year period who have come to see that learning can be meaningful.

One of the tableaus created by a Grade 3 and 4 class about the history of Montreal.

Other student groups across the province also experience insight, finding their voice and capacity to make changes in how they learn.

"We worked as a community to make negative changes into positive. We also learned through a clash of ideas. I also learned to go slower. Sometimes you have to step back and go at it differently. It is a lesson," says another student.

The students who participate become engaged, learn perseverance and, in turn, feel proud of themselves, their peers and accomplishments.

In summer 2012, *Leaders & Learners* published a preliminary study on this ArtsSmarts initiative titled *ArtsSmarts: The Québec Experience*. Three years later, "It has evolved from a focus on the effects of learning through the arts to capturing the potential of the arts as a way of learning," (Sutherland, 2014).

Continued on page 26

Continued from page 25

Through the years, two trends in particular are confirmed over and over again through ArtsSmarts projects: a shift in classroom dynamics toward authentic student collaboration and a strong impact on engagement for struggling students who have difficulty learning through the printed word.

This is best illustrated by the combined Grade 3 and 4 class with many struggling learners from an inner city Montreal school. They visited a local museum as a wrap-up to their project, which involved completing three beautiful tableaus tied to the history of Montreal.

The museum guide asked the teacher if they were from a gifted program because they were so knowledgeable about Montreal history. The students had researched information with their teachers and an artist, then recorded it through sketches and captions (instead of written notes) to produce their final works.

Impact on teachers

There are many times this approach challenged or changed teacher views of collaboration, traditional pedagogy and extending student learning, particularly for high school teachers.

"It really freed me to teach in a way that responded to the students' moods and interests at any point in the day. We could go for a walk to study the neighbourhood landmarks, create cultural posters, do our reading and paint while learning," says one teacher.

The documentation process for the research brings the element of reflection—both for the student and teacher—to student learning and teacher practice. Teachers have an opportunity to see their students through fresh eyes and witness most students exceeding their expectations.

"Students were so anxious to reflect on their learning that they rarely made it to the cafeteria on time. Instead, they preferred to stay in the class and discuss the day's lesson. Students like [Jack] who rarely shared their learning, were now talking about everything they worked on that day," says another teacher.

Lessons learned

Despite a school's size, location, population and differences in approaches by the artist-teacher partnerships, there is a continuous shift in teaching and learning in these classrooms.

The students who participate become engaged, learn perseverance and, in turn, feel proud of themselves, their peers and their accomplishments. Through this experience, "Teachers reaffirmed their commitment to their students by seeking new and innovative ways to promote teaching and learning," (Sutherland, 2014). ○

Julie Hobbs is a retired assistant director general from Riverside School Board, St-Hubert, Que. She is team leader for Assisting School Systems in Educational Transformation (ASSET), a school improvement initiative of the Association of Directors General of English School Boards of Quebec. She can be reached at jhobbs@rsb.qc.ca or on Twitter at @juliemhobbs.

Reference

- Sutherland, Stephanie (2014) *Participation, Pride, &Perseverance: English School Boards of Quebec ArtsSmarts Pilot Research Project Final Report (2010-2013).* www.artssmartsopen.ca/media/63506/ArtsSmarts%20Quebec%20Research%20Study%20Year%204.pdf.

Bringing Mathematics to Scale

By Janine Franklin and Kathy Witherow

At York Region District School Board, we have developed a comprehensive math strategy grounded in research. It includes a multi-disciplinary approach that sets system-wide direction and is responsive to emerging needs.

The five components of our math strategy are:

1. Building on Knowledge Base;
2. Learning and Teaching;
3. Equity: Intervention and Gap Closing;
4. Leadership; and
5. Parent/Community Engagement.

Students are at the centre of our strategy as we work to develop their mathematical skills and thinking processes for complex problem solving and help them develop perseverance, resilience and imaginative thinking to build their confidence and efficacy in mathematics.

Believing we are all mathematicians who can learn and do math is the first step. A growth mindset, where mistakes are valued as learning opportunities and effort promotes success, is foundational.

We continually ask ourselves how we are building a collaborative learning culture where a strong sense of self-efficacy is nurtured to support participants in feeling safe to take risks, persist through mistakes and persevere through challenges.

In these changing times, empowering educators and students to believe in their potential and understand they can make a difference when they try are valuable skills beyond mathematics.

Continued on page 28

Continued from page 27

We must consider complexities when planning, implementing and reflecting upon the intended outcomes of professional learning. With learning as the foundation, we work to ensure these opportunities are relevant and meaningful, purposeful and personalized, engaging to confirm and challenge thinking, and focused on empowering educators to support learning.

"Learning the work by doing the work"[1] has been our philosophy as we explore math and pedagogical content knowledge.

In designing professional learning models, we have incorporated processes to analyze students' mathematical thinking from an asset lens with opportunities to identify challenges, questions and possible steps.

We are exploring how the Teaching for Robust Understanding Framework[5] can be used as a tool for classroom and professional learning implementation and monitoring. The dimensions identified within the framework (content, cognitive demand, equitable access to content/professional learning, agency/authority/identity and uses of assessment) challenge our thinking as we continue to consider the dimensions of scale.

Leadership is identified in the Ministry of Education's *Paying Attention to Mathematics Education*[4] as one of the seven principles essential to improving mathematics. School leaders are responsible for building a culture of trust where educators are willing to learn with colleagues and try new approaches that ensure the relationship between teacher, student and content supports learning.

Our strategy includes a focus on building capacity of school leaders so they can engage in professional dialogue and monitor instructional practice through an inquiry lens. Research supports our belief that educators learn best from peers immersed in the same experiences.

This is why we are committed to developing teacher leadership. We work with teacher leaders to build their mathematical understanding and skills in facilitation and coaching so they can support professional learning within schools and across networks.

In the past, the emphasis has been on developing and implementing improvement plans with a focus on using wide scale assessment data. We learned that monitoring must be an ongoing part of our math strategy and that we all must take a role in monitoring our impact.

Using Guskey's[3] model of monitoring and developing a logic model to align our resources and strategies with our intended outcomes, we designed professional learning focusing on our goals.

We also built in feedback loops throughout the process to ensure we are collecting meaningful data that will monitor change in mindset, capacity and practice at all levels. ○

Janine Franklin is the curriculum coordinator in mathematics with the York Region District School Board. Follow her on Twitter @j9franklin.

Dr. Kathy Witherow is the former superintendent of curriculum and instructional services with the York Region District School Board. Currently, she is the field team lead of the student achievement division with the Ministry of Education. Follow her on Twitter @kwith64.

References

For a full list of references, email mcrane@matrixgroupinc.net.

Passing on the Teachings

By Léa Lamoureux

Students take time to work on their blogs.

Dene students share their experiences with the world.

Is it not exciting when we observe children coming to the understanding that they have a voice and others want to hear what they have to say? That their ideas, experiences and viewpoints matter? Blogging has had this impact in our school.

When publishing student writing through blogging is mentioned at our small, rural, aboriginal junior kindergarten to Grade 8 school, it is met with rapt attention and wide, sparkly-eyed anticipation.

After three years of blogging, our students know their voice is important and that there is a wider world out there; a world full of people interested in learning more about them as Dene youth and about their way of life, both past and present.

The thoughtful process by students has sparked an excitement about sharing personal cultures and traditions, as well as thoughts and reflections on other topics.

What started as an extension of the publishing part of the writing process, used to preserve ideas, thoughts and stories through technology, quickly became a magical mapping adventure. People from all around the world read the blogs and many were commenting, even those close to home, which may prove to be the most important and have the most impact.

The platform we use allows us to see where in the world our blog is being read. The rich exploration of geography related to tracking views and comments has provided for countless conversations and atlas searches, ultimately leading to many discussions related to culture, diversity and social justice. To claim that the experience has been eye-opening would be an understatement.

The concept of "audience" took on a whole new meaning as students began to understand that when blogging, the audience could be anyone, anywhere. What an engaging motivator to ensure exciting word choice! What a meaningful way to promote collaboration and learning conversations between students.

What has become both interesting and inherently clear, is that blogging makes our students feel powerful. While blogging topics vary, writing related to the ways of life of the Dene people, including the Dene laws, reflections on cultural experiences and writing related to the land and traditional arts are proudly published.

A seed of activism has sprouted. This has been a deeply positive, yet unintended outcome. The best example of which occurred when students published pieces of reflective writing after a visit to the Prince of Wales Northern Heritage Centre in Yellowknife, N.W.T. to view the commemorative traveling exhibit, Walking With Our Sisters (WWOS). It was designed to honour the lives of missing and murdered indigenous women and those who did not return from residential school.

When reading through the drafts of student writing, awaiting final approval, this quote from a student in Grade 7 illustrated the deep level of reflection that he was willing to share.

"When I was there (at the WWOS exhibit), I felt sad about the indigenous women and children; mostly, the children who never returned home from residential school. I, as a young Dene man, will not allow that to happen to indigenous girls and women that I know. These girls and women have families, like everybody. They deserve to live and be free and feel safe."

This student put his deep, personal views out into the world. He committed to promoting safety and to taking a stand.

Ultimately, the best "plug" for blogging is its cross-curricular possibilities. In addition to meeting a variety of outcomes, blogging naturally lends itself to practical, real-life lessons related to cybersafety. As for student engagement and stakeholder engagement? It is at the top of our list. ○

Léa Lamoureux is the principal of Kaw Tay Whee School in Dettah, N.W.T., which is part of Yellowknife Education District Number One. She works with an incredible team, students, community and District Education Authority every day. She believes that the possibilities are endless. Connect on Twitter @LeaLamoureux.

For more information about Walking With Our Sisters, check out www.walkingwithoursisters.ca. To read student blogs, visit www.kidblog.org/6-8Class2015, www.kidblog.org/3-6Class2015 and www.kidblog.org/1-3Class2015.

SPECIAL FOCUS

Garden of Inquiry

By Gidget Davidson

Imagine entering a classroom where you hear lots of talking and there is a buzz of excitement in the air. You observe students seated in clusters of four to five desks around the perimeter of the room. Each centre has a desktop computer.

As you focus on one of the groups, they appear to be collaborating on a presentation. One student points to the monitor while explaining something to the rest of the group. There is a wireless keyboard being passed around as the students take turns typing and adding to the presentation.

At the same centre, another student appears to be researching on a mobile device. The others lean in to discuss what is on the screen. All of these interactions seem to come naturally to these students. Despite the chatter, the students all appear to be highly engaged in this activity.

Did you imagine the students were seven to eight years old? In Susan Lindsay's Grade 2 and 3 classroom at University Heights in London, Ont., asking questions, researching and recording ideas using technology is everyday practice.

Throughout the Thames Valley District School Board, teachers like Lindsay are converting their traditional classrooms into Self Organized Learning Environment (SOLE) classrooms as a way to support inquiry-based learning.

The SOLE mindset was made popular by educational researcher Dr. Sugata Mitra, in his award winning Ted Talk, Hole in the Wall. Children are naturally curious and the positive effects of providing children with access to technology with Internet access and allowing them to explore and learn from one another are revealed in his study. Collaboration is encouraged as students search for answers to big questions.

Lindsay masterfully integrates the big ideas in science with other curriculum subjects while technology supports the learning.

A student's drawing of a plant to show seeds that travel by the wind.

In September, Lindsay prompted her students to "Rate the School's Garden."

The goal of the unit was to analyze the garden and provide recommendations of what to change or improve. Outside, students carefully examined the school's existing garden. They took pictures to document which plants were growing well or perhaps not thriving.

Inside, each student rated the success of the garden and certain concerns were identified. For example, one concern was the tiny carrots. Just like that, a student-centred, inquiry-based learning unit was born.

It did not stop at the carrots; many different inquiries took place as a result of the students' interests and questions. Lindsay found current newspaper articles and online resources for shared reading about topics, such as beekeeping.

In a collaborative document, students recorded their questions and sorted them into groups which ultimately led to further topics for inquiry about pollination, plants that attract pollinators, use of pesticides and more.

A student's map of the proposed garden.

For this age group, Lindsay found it was important to provide students with support and direction as they embarked on their research. She spent time locating resources and links to various age appropriate websites based on the direction of the students' interests as the garden inquiry grew and morphed. In the end, students demonstrated their learning about the benefits of planting certain species of plants and flowers in the school's garden in collaborative Google presentations.

Students created maps of garden plans using Google Drawings, or drawing and colouring a map by hand. Map reading of plant zones, detailed drawings of plants and persuasive letter writing were just a few of the many learning opportunities that stemmed from the question, "What should we plant in our garden?"

Lindsay expresses, "It's not a unit that you repeat again. You might use similar starting points, but it's going to be different next year because the kids are going to take it in different directions."

And yes, there will be a plot in the school's learning garden this spring where the research, hard work and recommendations of Lindsay's students will soon come to fruition. ○

Gidget Davidson is a learning technologies coordinator with TVDSB. She wishes to congratulate Susan Lindsay on her retirement. Follow her on Twitter @GIDavidson.

Reference

- www.ted.com/prize/sole_toolkit

Robotics: A Sport for the Mind

By Matt Ciprietti

The St. Mary Catholic Secondary School Robotics Team at the end of a successful competition.

Since 2006, schools in the Hamilton-Wentworth Catholic District School Board (HWCDSB) have been engaged in a different kind of competition—one that celebrates students' creativity, teamwork and technological prowess instead of athletic ability.

Normally, a stadium filled with thousands of cheering fans, high-energy music and a video crew following the action would be expected to be for a sporting event. Instead, you are at a For Inspiration and Recognition of Science and Technology (FIRST) Robotics Competition, where thousands of the best and brightest students from around the world showcase their science and engineering talents each year.

FIRST was founded to inspire young people's interest in science, technology, engineering and math (STEM) fields by holding annual robotics competitions at the elementary and high school levels. Since the HWCDSB's first involvement almost 10 years ago, the number of teams within its ranks has grown steadily and the impact on the students has been remarkable.

Students in Grades 4 to 8 participate in the FIRST Lego League (FLL), where students research and design solution to a scientific question and construct Lego Mindstorms robots to autonomously complete a series of missions simulating real-world engineering problems. Even students from kindergarten to Grade 3 can participate in Junior FLL, students design and build a moving Lego model and a Show-Me poster that explores a scientific concept.

According to Karen Moyer, principal of St. Luke C.E.S., FLL is about much more than just robots.

"It is about researching, creating, inspiring each other and believing in a team dream to make something happen. I see the students working collaboratively and cooperatively, thinking critically, and performing at levels that they never would have expected in elementary school." Moyer sees additional benefits from students learning from other teams, making new friends and honing public speaking skills through presentations to judges. There are also direct curriculum links. Junior FLL, for example, aligns well with the Grade 2 science movement unit with its emphasis on pulleys and gears.

High school students participate in the FIRST Robotics Competition (FRC), where each year they design, fabricate and program a 120 pound robot from scratch in six weeks in order to play a game that often resembles a team sport.

This task requires partnerships to be forged between teachers and the greater community for financial sponsorship and engineering expertise. The HWCDSB FRC teams have been fortunate to attract technical mentors from nearby universities as well as professional engineers and skilled parents to assist the students.

The board's first FLL team was founded by a parent and professional engineer, Matt Alderson. As his children grew up, he went on to found the board's first FRC team at their high school. The hours are long, but he sees it as a great opportunity to promote STEM careers.

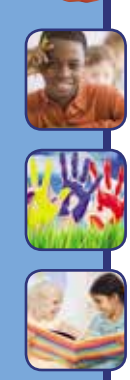
Alderson says, "The students get a chance to engage one-on-one with adult professionals as they learn new skills like CAD, programming, wiring and how to use tools. They are so much better equipped than their peers to make decisions about their future because they have had the chance to test drive a high-technology career."

Students from Guardian Angels C.E.S. watch their Lego robot complete its mission.

The HWCDSB has three FRC teams and expects to expand its FLL ranks to 15 or more teams in the upcoming season. This growth has been spearheaded by a number of teachers and administrators, including Morris Hucal, superintendent of education.

After seeing how engaged the students were, Hucal knew this was a program that needed to be spread throughout our schools. "The mentoring that is taking place has been incredible. Our board is dedicated to ensuring that our teams flourish and grow." ○

Matt Ciprietti is a science teacher at St. Mary Catholic Secondary School and a mentor for FRC Team 4039, MakeShift Robotics. For more on FIRST, visit www.firstroboticscanada.org.



STEM East Expo

By Shelley Gingras and Stacey Duff

Students have a great time at the first annual STEM East Expo.

The volume of information available can be overwhelming; the skills students learn as a result of effective science education helps them navigate it.

Science education focusing on developing scientific literacy skills can be applied to many aspects of life, from deciding how to solve a problem to making an informed decision when buying a car.

The Anglophone East School District (ASD-E) in southeastern New Brunswick, is committed to fostering curiosity, developing scientific literacy skills, reigniting the spark and increasing students' interests and attitudes in science, technology, engineering and mathematics (STEM).

This is starting to take place in classrooms. However, we want to take it one step further and create community connections so students meet, learn and work with professionals. It is one of the most powerful means to inspire curiosity in STEM courses.

ASD-E brought STEM to life by hosting the first annual STEM East Expo on May 15, 2014. At the one-day event, students participated in a wide array of activities, pursued learning interests and showcased design, research and problem solving projects.

The expo was a collaboration between industry, businesses, local colleges and universities, government, and professional organizations. Participants and attendees made their way through the hands-on exploration stations, industry trade show, elementary level project showcase, and the middle level and high school science fair.

The New Brunswick science curriculum clearly outlines the three processes of scientific literacy: inquiry, problem solving and decision making. Students must question their surroundings, develop and test hypothesis to explain observations, and use the information to make informed decisions.

Scientific literacy teaches students how to interpret text, graphs, data and infographics. Science teachers do not want students to simply consume information, but interact with it and evaluate its validity.

In New Brunswick, a curriculum shift may occur, but skills are still at the heart of the existing documents. Teachers need to move away from teaching only the knowledge strands. If the focus is on skills, doing a STEM project fits into the regular classroom.

Curriculum content provides a rich context to teach the skills. This new approach represents a pedagogical shift in how we approach science education. It is about how big ideas link together, not about individual concepts that may not seem related.

Each skill needs to be taught to students. If time is taken upfront to cover this, students and teachers will experience more success. The expo was designed to get students engaged in scientific inquiry.

Inquiry strategies are alive and well in the elementary grades and teachers are striving to involve students in scientific learning more as they move through the grades.

Inquiry is a natural process for children, but focused inquiry, the type where students are attempting to understand a particular relationship, happens with a lot of guidance from their teachers, especially at the beginning.

Along this journey, students are given more opportunities to refine their inquiry skills. The ultimate goal is to have students engage in open inquiry, the kind found in STEM projects.

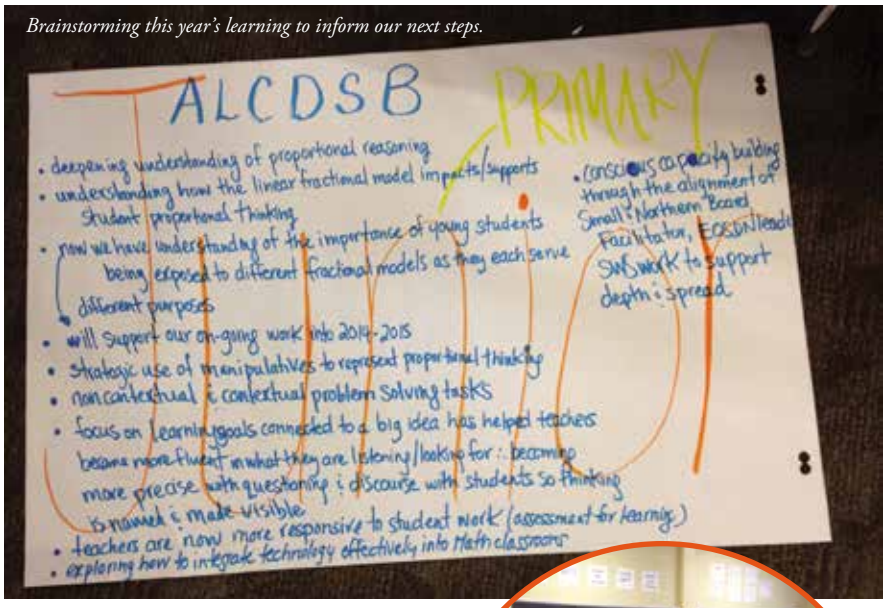
Teachers, schools and districts need to provide opportunities for students to explore the world around them through scientific inquiry. No matter the future professions of our students, scientific literacy is a valuable skill. It eliminates the mysteries of the world around them and creates citizens who are responsible for, and stewards of, this planet. ○

Shelley Gingras has worked for the Anglophone East School District for 12 years. Currently, she teaches high school math and science. She has been involved in the development of provincial science assessments and the high school coordinator of the STEM East Expo.

Stacey Duff has worked for the Anglophone East School district for 11 years. She has served as a high school math and science teacher, a middle school science mentor and chair of the STEM East Expo. Duff has a B.Sc. and M.Env.Sci. from Memorial University, a B.Ed. from Crandall University and is working on an M.Ed. from University of New Brunswick.

Junior Numeracy Collaborative Inquiry

By Victoria McGinn



Brainstorming this year's learning to inform our next steps.

The 2013-2014 school year was another exciting one for the teaching and learning of mathematics at the Algonquin and Lakeshore Catholic District School Board (ALCDSB). A math focus with the Eastern Ontario Staff Development Network (EOSDN) project guided the board with three goals: proportional reasoning, representation of student thinking and teacher fluency.

As a result, all Grades 4 to 6 teachers, administrators and special assignment teachers (elementary) were organized into eight hubs that met five times throughout the year through the CIL-M model for professional learning.

Project funding also provided opportunity for educators to work with Dr. Marian Small on proportional reasoning and to hear Dr. Cathy Bruce explain her current research on fractions.

Due to our focused work on fractions, the ALCDSB program team wondered why students were always representing fractional thinking in circles. During an EOSDN day with Bruce, she described observing this reliance on circles.

As a result of these findings, she was exploring the linear model representation, because it is this model that helps students understand fractions as a number rather than one number over another number. She said the first representations students are introduced to tend to stick with them.

This exposure to research, along with our observations and wonderings, led us to explore this topic deeper. We posed Bruce's question to junior grade students:

- Amy walks 1 1/2 kilometres to school. Louise walks 1 3/8 kilometres to school. Who walks farther? What image would you use to help represent this fraction story?

To help us sort and analyze student work, we used the following information to guide us:

- **Big idea:** The context or situation determines the appropriate representation.
- **Learning goal:** A number line is an appropriate representation of fractional thinking when comparing distances.
- **Success criteria:** The student:
  - » Knows which fraction is greater (knowledge and understanding);
  - » Uses an image to show how much greater (communication); and
  - » Uses an image that is the most appropriate representation for the story context (application).

Approximately 85 per cent of students responded by using an area model representation (mostly circles), despite the problem being a linear context. Surprisingly, in analyzing student responses, many educators thought a high level of understanding of this problem was demonstrated when students used a circle to show 1 1/2 was greater than 1 3/8.

When we probed student thinking further, we found that with many, there were gaps in their understanding. Students could use circles to show which fraction was greater, but were challenged to articulate the actual number relationship.

We considered the following questions:

- How often do we level student work based on knowledge and communication and say it is a level four without considering application of student thinking?
- With this in mind, where is educator feedback focused in relation to knowledge and understanding, communication and application?
- How often are learning goals based on doing rather than understanding because of educators' mathematical comfort?
- How might learning goals based on understanding impact educator fluency and student achievement?

Dr. Marian Small facilitating a proportional reasoning lesson in a junior classroom.

The opportunity to link our inquiry work with the research of Small and Bruce continues to impact our work with educators and students in kindergarten to Grade 3.

We now recognize the importance of presenting different representations with the appropriate context from an early age. Educator fluency increases as they explore different representations with students.

Fluency in knowing what to look for, and what to listen for, when student thinking made visible is impacting student's ability to think flexibly and reason proportionally. Mathematics professional learning continues to be an exciting journey in 2014-2015!

Victoria McGinn was a classroom teacher for 15 years. Now, she is the Small & Northern Boards numeracy facilitator and EOSDN math project committee lead for Algonquin & Lakeshore Catholic District School Board.

Research Collaborations in Support of Teaching & Learning

By Christine Battagli

Research collaborations between Niagara Catholic District School Board (NCDSB) staff and external researchers support the board's strategic directions, which is to build strong Catholic identity and community to nurture the distinctiveness of Catholic education and to advance student achievement.

Research collaborations go beyond co-authorship of a final paper. The collaborations are predicated on mutually beneficial relationships between board staff and researchers as they make inquiries into educational processes where each values improved student success.

Fundamental to the process of research proposal consideration and the building of relationships for research collaborations is the work of the board's Research Ethics Review Committee (RERC).

The committee considers research that aligns with the board's strategic directions and system priorities; protects the safety, learning and anonymity of students, staff and families; offers opportunities for professional learning for staff; supports a model of collaboration between NCDSB staff and researchers; and supports student success.

Active participation by superintendent of education Lee Ann Forsyth-Sells and consultant Christine Battagli, in the School Board University Research Exchange Network, also promotes partnerships for education between the board and universities.

Research findings are shared with collaborators and presented to staff in support of knowledge mobilization and evidence-informed decision-making to improve student achievement and support the board improvement plan for student achievement.

NCDSB has engaged in research collaboration with Brock University researchers Dr. Tiffany Gallagher and Dr. Marybeth Fortune to advance student achievement in mathematics. The Early Years Math Inquiry project, which began in 2013, follows the work of the earlier research collaboration, Junior Math Interventions project from 2011.

This research includes inquiry relating to teachers' practices, beliefs and attitudes, and the impact on student achievement. A report to the Literacy and Numeracy Secretariat (LNS) was published in 2014 and a new report will be published upon completion of the latest research.

Integral to research collaboration is the work of our numeracy facilitator, Chris Moscato, and numeracy coaches, Laura Cronshaw and Jaime Rootes, who collaborate with Gallagher and Fortune to develop challenges of practice and conduct research in schools.

Moscato says, "With the partnership between Brock University and Niagara Catholic, we are able to leverage the strength of both organizations."

This involves job-embedded co-planning and co-teaching along with professional learning to build capacity in mathematics content knowledge for teachers. In this model of research collaboration, all partners participate in an inquiry-based professional Catholic learning community focused on supporting students' conceptual understanding of number sense and numeration.

The 2013-2014 final report for the LNS shares key findings and implications for further research and work in the area of improved student achievement in mathematics, beginning in early years.

For example, the use of diagnostic assessments proved favourable in that it moved "the educators' orientation away from a deficiency perspective... and prioritized student learning around foundational instructional concepts such as the eight principles of counting."

Teachers' beliefs about math instruction shifted and appreciation for access to support was seen as "a positive influence in their efforts around instructional capacity."

Qualitative findings suggest "students appear to be more confident in math, more comfortable with open ended tasks, and willing to take risks." Quantitative results showed a significant growth in student performance for all early years and primary students in the majority of assessed concepts.

NCDSB will continue to engage in research collaborations with external organizations that align with the mission, vision and values of our board.

We look forward to continued success in collaborating with researchers and community partners as we seek solutions to challenges of teaching practice, encourage professional learning and continue to focus on greater success for all NCDSB students from the early learning kindergarten program to graduation. ○

Christine Battagli is the consultant for research, assessment, evaluation and reporting, chair of the Research Ethics Review Committee and Managing Information for Student Achievement (MISA) lead for Niagara Catholic District School Board.

Designing Learning

By Dorie Hanson and Pam Walsh

Children discussing what is important about their community.

Children learning what makes a bridge stable.

The impact of quality instruction on student success has never been more important than in today's classrooms which strive to prepare students to create their best futures. So, what does quality instruction look like in the 21st century?

Much of the recent research speaks of designing learning that focuses on solving authentic problems, integrating subject areas, decision-making, collaboration and making effective use of technology. In recent years, this type of learning environment has been a focus for teachers and leadership team members in the South Slave Divisional Educational Council (SSDEC) as they work to learn more about how to design inquiry-based learning experiences.

The SSDEC serves eight schools in five communities in the Northwest Territories. It is in year eight of implementation of the district's *Leadership for Literacy* initiative. A key factor in the initiative's success is the implementation of literacy and instructional coaches in each school. Coaches focus on providing ongoing job-embedded professional development for staff to become proficient using research-based practices.

One area where teachers experience intensive support is through an integrated planning approach first introduced in 2010 as a pilot called Interdisciplinary/Inquiry Curricula Planning (ICP). The goal is to offer teachers the opportunity to engage in more effective planning through a collaborative and interdisciplinary approach that identifies essential learning outcomes and focuses students' learning on overarching inquiry questions.

This approach aligns with what is deemed important for 21st century learning, including engaging students, increasing student's critical thinking, creativity, collaboration, communication and problem solving skills. ICP planning also aligns with the territory's Minister's *Education Renewal and Innovation* (ERI) initiative focus: to honour and engage students in authentic learning.

With deepened focus on student engagement, it was a natural fit to reach out and connect with the celebrated Galileo Education Network. This organization supports the idea that understanding is developed through the process of people working together to solve real world problems.

The goal is to improve student learning through planning that is collaborative with participants over a sustained period of time.

Continued on page 36

Continued from page 35

Galileo supports the mentoring of teachers in classrooms.

In the fall of 2013, Judy Martin, a Galileo facilitator, began working with our coaches, program support teachers (PSTs) and interested teachers to explore research behind inquiry-based learning and look at how to design learning experiences that are engaging and authentic. By year's end, 11 classroom-based teachers worked with Martin, alongside school-based coaches and PSTs. Direct support was provided to teachers, both online and in schools, to develop inquiry units that were contextual and relevant to the curriculum.

Martin was the SSDEC's key presenter at our two-day, all-staff in-service the following August. This in-service built on our understandings and provided foundational support for all teachers in our region to design at least one inquiry unit to implement during the 2014-15 school year. Teachers continued to be supported in-house by leadership teams and through Skype from Martin.

This year, we saw students in South Slave exploring meaningful questions, ranging from "How do you seize your day?" to "Can men get breast cancer?" to "Is our school safe?". During the implementation of the units, students had opportunities to engage with experts in the field, explore authentic environments connected to the inquiry, and apply their learning with hands-on explorations.

The final inquiry tasks provided opportunities for students to use a variety of methods to share their learning. Evident throughout the implementation and follow up communications is teachers' enthusiasm and increased student engagement in the learning process. ○

Dorie Hanson (BA, B.Ed., M.Ed. in leadership and school improvement) and Pam Walsh (BA, B.Ed., M.Ed. in curriculum, learning and teaching) are program coordinators for the South Slave Divisional Education Council in Fort Smith, N.W.T. Their primary responsibility is to support school-based instructional coaches as they support their teachers in implementing research based instructional strategies identified in the region's Leadership for Literacy initiative. Hanson's focus is on supporting the kindergarten to Grade 6 schools and Walsh's focus is on supporting the Grades 7 to 12 schools.

Raising Awareness for Autism

The Durham Catholic District School Board's first Reaching Out Conference raised awareness for supporting students on the autism spectrum.

The conference highlight was the comedic keynote speaker, Michael McCreary. Diagnosed with Asperger's syndrome at age five, the 19 year old speaker took the audience on a comical journey as he shared what it is like to live with Asperger's.

Distinguished Leadership Award

At the annual Ontario Public Supervisory Officers' Association (OPSOA) conference, Dr. John Malloy was presented with the Distinguished Leadership Award. This award is presented to members who demonstrate outstanding ability and leadership in public education at provincial and local levels.

Cliff King Award

The Northwest Territories Teachers' Association's (NWTTA) prestigious Cliff King Award for outstanding contributions was awarded to educator and past NWTTA professional development coordinator, Colleen Eckert. Eckert came to the NWTTA in 2005 after years as a northern educator and professional development coordinator for the Nunavut Teachers' Association.

Honorary Membership Award

William G. Davis, 18th premier of Ontario, was the recipient of Ontario Catholic Supervisory Officers' Association's (OCSOA) Honorary Membership Award. The past premier's speech proved he can still command a room and that his principled visionary action makes him a worthy recipient of the award.

CASSA EXL Award

Ontario Catholic Supervisory Officers' Association (OCSOA) honoured John Crocco, director of education for the Niagara Catholic District School Board, as its nominee for the CASSA EXL Award 2015. The award is based on dedication and enthusiasm, the scope and quality of children's educational experiences, and the creation of environments that promote children's attitudes toward learning. Xerox Canada Ltd. and CASSA sponsor the award.

Alberta Education Minister

On May 24, 2015, Rachel Notley was sworn in as premier of Alberta and announced her cabinet. David Eggen was sworn in as Alberta's Education Minister. Eggen was first elected as an MLA in 2004 and is one of four incumbent Alberta New Democrats MLAs re-elected in the May 5 election, which saw the party form government for the first time in Alberta's history. Eggen has a bachelor of education. He has taught internationally and in Edmonton.

Robert T. Mills Director General Announces Retirement

After more than 42 years, Robert T. Mills announced he will retire at the end of this school year as director general of the Lester B. Pearson School Board.

Mills's career included roles as teacher, department head and senior administrator with the former Protestant School Board of Greater Montreal as well as leading the Educational Services Department at Lester B. Pearson prior to assuming the role of assistant director general at the LBPSB in 2001. Mills has been director general of the LBPSB for the past nine years.

Educational Leadership in Quebec

The Association of Administrators of English Schools of Quebec (AAESQ) and the Quebec English School Board Association (QESBA) held their annual spring conference May 21-23, 2015. The theme was Educational Leadership: A Balancing Act. Conference delegates attended breakout sessions on a variety of topics related to educational leadership.

Make 5% on GIANT TIGER Gift Cards!

Giant Tiger wants to help you put the fun back in FUNdraising!

We're proud to partner with the schools in our community by offering Giant Tiger Gift Cards at a discounted price.

Sell them at face value and fund your event!

Top 10 reasons to fundraise with Giant Tiger

1. It's easy to sell what people need.
2. Minimal space required.
3. Fundraise year-round or one time.
4. Use it to complement existing fundraising campaigns.
5. Can be pre-sold or pre-purchased by the school.
6. Easy to manage and track. (We provide the tracker!)
7. Giant Tiger is a unique and friendly place to shop and discover.
8. Giant Tiger is connected and committed to your community.
9. Giant Tiger always has outstanding value for your family's money.
10. Giant Tiger gift cards are peanut free!

Are you ready to start FUNdraising?

Email us at servicerevenue@gianttiger.com to kick off your campaign!

GIANT TIGER

THIS IS REALITY!

Students need to **INCREASE** basic skills.

So let's **NOT** have Begging Students.

Teachers need to **DECREASE** work time.

Let's **NOT** have Sweaty Teachers.

Take 20 minutes to watch a free DVD

Grades K-6

* Simultaneously teach reading, spelling, penmanship, composition, comprehension
* Structured and sequential (MISSING FROM SO MANY PROGRAMS)

THE "RESCUE" APPROACH FOR BASIC SKILLS BUILDS SUCCESS FOR TEACHERS AND STUDENTS.

HOW ABOUT THE SCHOOL BOARD?

Have school board members go to our website.
Have them pull up the Administrator's Price list from the Products Tab

For a look at the material:
*Give the members a free 20 minute DVD ordered from our website
*Select Product/Overview from our website; press bar to see samples from grades K-6 that are designed to be grade specific or non-graded
***Visit our YouTube presentations at RescuetheStudentsNow**

TEACHERS SHOULD OWN BOTH TEACHER'S SETS TO SEE HOW THEY CAN ACCOMMODATE RAPID AND CONTINUING GROWTH FOR EVERY STUDENT

The entire class can use the material and be tested as a total group.
The program can also be used by small groups or a single student.

Material can be used independently or to enhance your current curriculum .

Save your chapter books and old adoptions. Once the basic skills are achieved, the students can use previous material to add more insight to the learning hierarchy.

" I can attend grades K, 1,2,3,4,5,6 for a total of $44.

D & R Enterprise **www.rescuethestudents.com** **info@rescuethestudents.com**
Diane Robert
6406 Scenic Drive
Yakima, WA 98908

Rescue the Students Now